

Field Botanist

for a Day:

A Group Exercise
for the Introductory Botany Lab

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Introductory botany instructors often hear students ask, “Why do I need to know about plants?” Many students at the entry level have difficulty appreciating the applications of plant biology. A second problem encountered is that many botany labs tend to be descriptive rather than experimental. The following three-part lab can address both these issues. The botanical objectives of the lab are for students to learn field identification, to use the morphology and taxonomy they have learned in the course, and to learn about the ecology, natural history, and economic botany of the plants living around them. The skills practiced during the lab are those of group work and oral and written communication. The lab is perceived by students as a break from microscope and specimen work, a chance for independent group work, and an opportunity to apply their botanical knowledge and skills.

Lab One. Introduction to Field Guides

During this lab, students are given instruction on the use of tree and wildflower guides to key out

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unknown specimens. For wildflowers, the system in *Newcomb's Wildflower Guide* (1989) has proven to be satisfying and easily learned by students. With this book the novice botanist can make accurate identifications. The drawings are excellent (many in color) and serve as a check on the user whose botanical descriptions have led to an incorrect identification. A comprehensive tree guide preferred by students over more recent publications is Harlow's (1957) book, *Trees of the Eastern and Central United States and Canada*. It covers both gymnosperms and angiosperms, and has a dichotomous key that leads users first to family groups that are then searched using finer dichotomous keys for species identification. It is illustrated effectively with black and white photographs, and provides substantial background on the origin, growth, and use of each species. For spring semester labs when leaves may be absent from most trees, *Fruit Key and Twig Key to Trees and Shrubs* by Harlow (1946) is useful. Students find the twig key challenging initially because of the specialized terminology employed, but find the fruit key quite easy to use. Both sections of the book are illustrated with black and white photographs for confirmation of identification. All three guides are inexpensive in paperback. Unless the course makes heavy use of the guides outside these three labs and the instructor wishes each student to own one, it is effective to purchase a single copy of each guide per group of students and to keep the books as lab equipment.

HOW-TO-DO-IT



This lab may start indoors with explanations of the system used by each field guide and of some of the unfamiliar terminology used. Previously-collected specimens of tree fruits, leaves, twigs, etc. are used as students familiarize themselves with the guides. Fruits of sycamore, oak, sweetgum, tulip poplar, birch, catalpa, maple, and others keep well if dry. They can be collected throughout the year and saved for this purpose. It is useful for the class to work through a few specimens, one for each field guide, as a group led by the instructor. The lab may continue outdoors on campus with students asked to work in pairs to identify specimens marked by the instructor.

Lab Two. Field Work

Lab Meeting Two takes place at a local park, field station, or recreation area. Students are divided into groups (usually 4 per group) and assigned an area of the park. Equipped with field guides, clipboards, field lenses, a map of its area, and writing utensils, each group's task is to key out as many angiosperm and gymnosperm specimens as possible in the assigned area. They are also asked to look for and note the presence of bryophytes or ferns and other features of the area. Working together, students discuss their botanical definitions and debate identifications. Each group leaves with a written list of the species in its area and a brief description of each that will permit them to find the specimens easily the following lab meeting.

Work Outside Class Time. Preparation of a Presentation on the Area

On their own time, the groups work to develop an interesting and informative nature walk accompanied by a written trail guide focusing on the plants they identify. They are instructed to come to the next lab meeting ready to give the class a guided tour of their assigned area. In the tour they are instructed to identify specimens of interest and explain the key characteristics that led to the identification—for example, the broad lenticels on a sweet cherry tree or the differences between a sugar maple and a red maple. In addition, students are expected to research and present the natural history, physiology, or economic botany of the plants they identify. Interesting questions that may come up are: What plants are nitrogen fixers? Which provide food for wildlife? Which are native and which are introduced? How does each affect the ecosystem? What medicinal uses are there for the plants? How is the lumber used?

Students are expected to use not only their field guides, but the Internet, and books from the library to research the plants. In the preparation of their written

and oral presentations, students are encouraged to use the botanical terminology they have learned throughout the course (gymnosperm, pith, phyllotaxy, monocot, samara, gametophyte, terminal bud, monoecious, prickle, trichome, secondary metabolite, cork cambium, etc.).

Lab Three. A Walk in the Park

Lab Meeting Three takes place a week or two later at the same site as the previous lab. Groups are given 15 or 20 minutes at their areas to observe changes such as new flowers opening, leaves expanded, insect damage, etc., and to finalize their presentations. The class then gathers and walks the site for a guided tour of each group's area. The members of the group take turns educating the rest of the class about the plants they have identified and researched. Students are told to expect questions from the instructor and from their colleagues.

At the end of the lab, each group turns in a written copy of its "guide" to the area, complete with a bibliography of sources used. The grade for the series of labs is based on the quality of the fieldwork, and of the oral and written presentations. Groups are given written feedback from the instructor on each aspect of their performance. The group is graded as a unit, and each group member receives the same grade. This encourages true collaboration.

Conclusion

This series of labs is most effective near the end of the semester, when students can apply the terms and knowledge they have gained throughout the course. Students enjoy the lab and are often surprised at their ability to prepare and deliver a botanical presentation, as well as to understand and critique the presentations of their colleagues. They appreciate their own learning when they are able to teach and explain things to others. The medicinal and industrial uses of the trees are of particular interest to the students. Some students report that they give family and friends the tour. Seeing botany in use after the course is over is great.

References

- Harlow, W.M. (1946). *Fruit Key and Twig Key to Trees and Shrubs*. New York, NY: Dover Publications, Inc.
- Harlow, W.M. (1957). *Trees of the Eastern and Central United States and Canada*. New York, NY: Dover Publications, Inc.
- Newcomb, L. (1989). *Newcomb's Wildflower Guide: An Ingenious New Key System for Quick, Positive Field Identification of the Wildflowers, Flowering Shrubs and Vines of Northeastern and North-Central North America*. Boston: Little, Brown and Co.