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This article reprinted from:

Tschunko, A. 2005. Active learning formats for botany field trips. Pages 375-378, in *Tested Studies for Laboratory Teaching, Volume 26* (M.A. O'Donnell, Editor). *Proceedings of the 26th Workshop/Conference of the Association for Biology Laboratory Education (ABLE)*, 452 pages.

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ISBN 1-890444-08-1

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Active Learning Formats for Botany Field Trips

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Introduction

Are you tired of leading field trips in the “pied piper” format? The traditional field trip consists of the leader at the head with the students trailing behind. Upon arrival at a specimen, the leader calls a halt and the group encircles it; the leader points out particular key characteristics and delivers a mini-lecture on the species while the students passively take notes.

There are alternate ways to conduct plant identification field trips that engage the students *actively* and are also more fun for the students. The following active learning formats which put students in charge can also be used for non-botanical field trips.

Active Learning Formats

I. Each student researches, finds, identifies and tells about his/her assigned species

Let each student select one or two species from a list provided. Each student is then in charge of researching the identifying characteristics and other specified information about that species before going outdoors. On the trip, each student is responsible for locating a live specimen of his/her species, and then identifying and teaching the group about the species. This can be accomplished in several formats:

- (a) Have the group follow a map that gives the *approximate* location of a specimen of each of the species on the plant list for the day. At each approximate location, the student in charge of that species finds it and the student teaches the group about that species. A variation of this format is to have the whole group of students working with field guides to find the specimen in that location and then the student in charge of that species confirms the group’s identification and teaches about that species.
- (b) Send the students without a map into an indicated area (a portion of campus) to find their assigned species. Upon finding their species, the students return to mark their specimen locations on a map and to decide on a circuit for the group to walk. Then the group walks the

circuit through the area and each student identifies and teaches about his/her plant species. Note: Random off-trail searching of a natural area by a student group is generally not advised due to the destructive nature of foot traffic and the greater possibility of encountering unanticipated dangers (venomous animals, poison ivy, stinging nettles, etc.)

- (c) Lead the group down a new trail after instructing the students to call a halt when they find their assigned species; the student then identifies and teaches about his/her assigned plant.

II. *Students identify and research an unknown specimen found in the field*

Lead the students to each specimen but have the students identify it and find interesting information about it in various reference books that they have brought along. The first student to identify correctly can get a reward—points, chocolate, etc.). This method is also useful when, due to weather conditions, you present an “armchair fieldtrip” by showing slides and the students identify and research the plants shown.

III. *“Within sight of me is species X; where is it?”*

Lead the students to the approximate area of a species and say, “Within sight of me is species X; where is it?” The group consults various references to learn the identifying characteristics; the first student to locate a specimen can get a reward; the references are then consulted further for interesting information about the species.

Discussion

These active learning formats for field trips involve students actively; they are not just passively following the leader. There are also additional advantages to these active learning formats:

- In all these formats, the students become familiar with the contents of various reference books. They learn where to find what information; they learn about the organization of and differences among the various field guides; they develop personal preferences for certain references and thus determine which references they would want to buy for themselves later.
 - In all these formats, the student’s observational ability is sharpened. Because the students have to identify the plants themselves, they must engage in closely and accurately observing, comparing, contrasting, and evaluating plant characteristics. This is especially true for the formats in which the students have to find the specimen themselves, thus having to evaluate and eliminate various similar species in the area.
- Format 1 especially, which puts each student in charge of a species, gives students a feeling of ownership of the species.
 - Format 1b, which requires the group to mark their specimen locations on a map and decide on a circuit for the group to walk, has the added benefit of having students experience the process of planning a field trip.
 - Format 1c, which requires students to call a halt when they find their species along the trail, requires students to be alert and observant during the entire trip rather than just following along until the leader stops. Commonly, students are not observant enough and will pass right by their plant; when this happens, go a little way beyond the missed plant before calling a halt and

announce that a specimen has just been passed; have the group wander back up the trail until the specimen is located by its student.

It is important that students view the identification of a plant as the beginning and not the end of the learning process. The plant's name is the key to accessing other information about the plant. Various references give information such as the plant's ecological role, soil/habitat preference, flowering time, range, uses (by native people, pioneers, and currently), etc.

Since field trips are commonly done on trees, an annotated bibliography at the end lists examples of tree reference books that can be taken into the field. The large Floras that include every plant species in the covered region are too frustrating and cumbersome for the field. The tree field guides are quite inclusive and good in the field. (Wildflower field guides, in contrast, contain only a selection of the more common wildflowers and may well not enable you to identify an unknown plant to the species level.) After the field trip, students may consult the all-inclusive Floras in the lab in order to confirm any uncertain field identifications.

In conclusion, use these active learning formats for botany field trips to put the students in charge and to guide them in their discovery of plants. To add variety to the course, use a different trip format each week.

Bibliography of Field Guides to Trees

Note: Non-native species growing in urban areas (campuses) may not be covered in some of the books.

The Whole U.S.:

Brockman, C. F. 2001. *Trees of North America: a field guide to the major native and introduced species north of Mexico*. Revised edition. (Golden field guides from St. Martin's Press). St. Martin's Press, New York, NY, 280 pages.

A really nice compact book covering the whole US and Canada--eastern, western and southern tree species. The figures are color drawings; brief description of each species accompanied by range map. Includes yuccas and palms.

Northeastern U.S.:

Graves, A. H. 1992. *Illustrated guide to trees and shrubs: a handbook of the woody plants of the northeastern United States and adjacent Canada*. Revised edition. Dover Publications, New York, NY, 271 pages.

This is a Dover reprint of the 1956 revised edition book that was published by Harper & Brothers, New York. This book also includes brief descriptions of some introduced species. Excellent detailed pen-and-ink drawings of leaves, twigs, buds; good dichotomous "summer key" and "winter key" in front. This old book has some pieces of information very useful in identifying that the other field guides do not.

Harlow, W. M. 1957. *Trees of the eastern and central United States and Canada*. Dover Publications, New York, NY, 288 pages.

This is a Dover reprint of a book originally published in 1942 by McGraw-Hill Book Company; tons of information in a small book; for each tree species there are black-and-white photos of bark, twig, leaf, fruit or cone, and the text often includes information on how the pioneers and native Americans used the tree. A great little book. Another oldie but goodie.

Petrides, G. A. 1986. *A field guide to trees and shrubs: northeastern and north-central United States and southeastern and south-central Canada*. Second edition. (Peterson field guide series). Houghton Mifflin Company, Boston, MA,

This book is a must in the eastern U.S., since it *includes the shrubs and woody vines*, which are not included in other "tree" field guides and for which no separate field guide exists. The figures consist of clear simplified line drawings of the leaves or needles. Does not include the deep South.

Eastern U.S.:

Little, E. L. 1980. National Audubon Society field guide to trees: eastern region. (Audubon Society field guide series). Alfred A. Knopf, New York, NY, 714 pages.

The figures consist of color photographs of bark and leafy twigs of each species; then a section of photos of tree flowers, then a section of photos of tree fruits, and finally a section on colorful autumn leaves. Line drawings of range maps, winter silhouettes and fruits accompany many of the text descriptions.

Petrides, G. A. 1998. A field guide to eastern trees: eastern United States and Canada, including the midwest. First edition, expanded. (Peterson field guide series). Houghton Mifflin Company, New York, NY, 424 pages.

Note that this Peterson Field Guide of eastern trees does *not* include the shrubs and vines but does include the trees of the deep South; it has color drawings of the leaves and needles.

Western U.S.:

Little, E. L. 1980. National Audubon Society field guide to trees: western region. (Audubon Society field guide series). Alfred A. Knopf, New York, NY, 639 pages.

The figures consist of color photographs of bark and leafy twigs of each species; then a section of photos of tree flowers, and a section of photos of tree fruits. Yuccas, palms, large cacti included. Line drawings of range maps, winter silhouettes and fruits accompany many of the text descriptions.

Petrides, G. A. 1998. A field guide to western trees: western United States and Canada. First edition, expanded. (Peterson field guide series). Houghton Mifflin Company, New York, NY, 428 pages.

This field guide has plates of colored drawings; included are conifers, broadleaf trees, palms, large cacti and yuccas.

Some Selected Trees:

Coombes, A. J. 2002. Trees. (Smithsonian handbooks). Dorling Kindersley, Inc, London, 320 pages.

This book is a selection of trees native to the temperate regions of the world, both northern and southern hemisphere. It includes most of the tree species planted in urban areas. It includes various cultivated varieties in the nursery trade, which makes this book useful in identifying an unusual tree on campus. The figures consist of photographs of plant parts on a white background. This is a good book to have as a reference but not as easy for beginners to use as one of the standard field guides because species are arranged by plant family.

Lanzara, P. and M. Pizzetti. 1978. Simon & Shuster's guide to trees: a field guide to conifers, palms, broadleaves, fruits, flowering trees, and trees of economic importance. U.S. editor: Stanley Schuler. (Simon & Schuster nature guide series). Simon & Schuster, New York, NY, 317 pages.

Only a selection of trees is covered. It is a useful reference for color photos of cloves, cashews fruits, almond fruits etc. as they appear on the plants. This book has an introductory chapter on tree biology followed by species descriptions divided into six sections as indicated in the title. Each species has a half-page photo and half-page text with line drawings in the margin.