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Campus Field Trips: An Effective Supplement to Classroom Instruction

Enriching the Biology Curriculum Just a Short Walk Away from the Lecture Hall

Paul V. Switzer

At the water, Robb, Laura, Becca, and Jenn are experimentally testing theories of group formation and habitat selection on a small flock of ducks. A hundred feet away, another group of students is comparing the species diversity and species composition of plant communities in disturbed and undisturbed areas. Across the bridge, a third group is struggling to find an example of primary succession, so that they can compare its characteristics to the example of secondary succession they found a few minutes earlier.

These students are all learning about ecology in a fun and relaxed setting through the hands-on application of concepts presented in their lecture. Their projects, however, aren't being conducted during a lengthy field trip to a remote site. Rather, the trip is being held during a one-hour discussion section right in front of the administration building on campus. The

whole outing required relatively little planning, and was funded for the cost of a loaf of bread.

Field trips can add a whole new dimension to a course's content and effectiveness. They provide an excellent opportunity to learn material in the "real" world, increasing both the students' interest and comprehension of the material (McNamara and Fowler, 1975; Falk, 1983; McKenzie *et al.*, 1986). Field trips also allow the students and instructor a chance to get out of the classroom and interact with each other in a more informal setting. Strengthening the relationships between the instructor and students and among the students themselves can transfer into more interactive and effective classroom teaching.

Field trips in biology courses give additional advantages. Students see animals and plants in their natural habitats, and thus see natural patterns of occurrence and distribution (Ferrier, 1989; Klepper, 1990). The natural habitats also provide a stage for observing natural behavior and interactions taking place among animals and plants, and for noticing first hand the challenges these organisms face and the

characteristics that allow them to survive. When students actually observe the events that the class discussed (*e.g.* mating behavior), they reinforce the theories the instructor presented to explain the events (*e.g.* sexual selection). Students get a chance to be real field biologists, and by working through all the accompanying excitement and problems, learn about the process of discovery in biology. Also, field trips demonstrate that biology doesn't just exist in a book (Ferrier, 1989); rather, scientists derive biological concepts from real organisms, many of which exist around us every day. Students too frequently miss this seemingly obvious point.

Few instructors would doubt these advantages of field trips as instructional tools. However, field trips have several drawbacks as well:

▲ Field trips may be costly. Food, transportation, lodging, and special materials can be quite expensive (Lopushinsky and Besaw, 1986; McKenzie *et al.*, 1986), and with course funds often being scarce to nonexistent, this expense may present a serious problem.

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▲ Liability issues can cause instructors and institutions to be wary of field trips and their associated risk (Keown, 1984).

▲ Planning a field trip requires a significant amount of time. Obtaining permission for the field trip itself, arranging transportation, and organizing and purchasing meals all take time, even if the class takes the same field trip every year (Ferrier, 1989; Fisher and McLaren, 1989; Beiersdorfer and Davis, 1994).

▲ Accommodating students with disabilities may involve special arrangements due to the nature of the field trip (Beiersdorfer and Davis, 1994).

▲ Today's biology classes often have large numbers of students enrolled, although teaching assistants may concurrently lead smaller discussion sections. The sheer number of students may make effective field instruction difficult, accentuating these drawbacks and causing the very idea of a field trip to seem completely overwhelming and impractical.

These drawbacks may have two main effects on the practice of incorporating field trips into courses. First, courses that previously included trips in their syllabus may abandon that type of instruction. Field trips can simply become too troublesome or costly to conduct. Second, instructors contemplating adding a field trip to an existing course may be less likely to do so. The hurdles one must overcome to add field trips may present such a headache that the whole idea is dropped in favor of less aggravating options.

Unfortunately, the problems seem to be the greatest for many of the courses that would truly benefit from a field trip. For example, introductory biology classes provide one of the best opportunities to hook students on biology, and field trips are a great method for doing just that. However, introductory classes often have high

enrollment and low per-student funding; incorporating field trips in these classes may appear to be especially difficult.

Fortunately, instructors need not despair if "traditional" field trips don't fit into the course; instead, they can include one or more "campus" field trips. By campus field trips, I refer to any field trips that can be accomplished either right on campus or within a short walking distance of campus. These field trips, by design, fit into the normal time slot available for the class, including the travel time to the specific location. Many campuses, such as ours at the University of

monitoring long-term experiments. Also, an instructor may design a series of field trips around solving a general biological problem, with each trip's specific experiment or observation changing as the class refines the problem. Similarly, an instructor may elect to use two campus field trips. On the first trip, the class can observe general patterns, and on the second trip, students can test those patterns.

Another great benefit of campus field trips is the effect they have on students' awareness of their surroundings. Students frequently remark that they are amazed at the amount of "biology" that exists around them in their every-

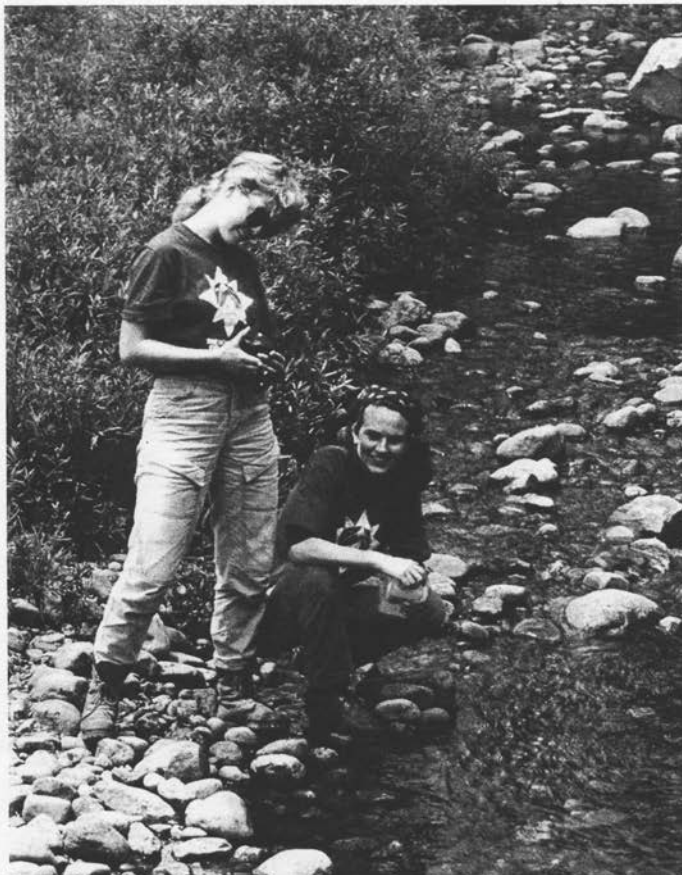
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California-Davis, include relatively natural areas right on campus that are perfect for such field trips. However, even urban campuses have enough biological content to justify a campus trip (Hale, 1986). In fact, the challenges faced by organisms in a highly urban environment make an interesting topic in and of itself.

Campus field trips, while not a new idea (Wheeler, 1985; Hale, 1986; McKenzie *et al.*, 1986), provide an often-overlooked solution to many of the drawbacks of traditional field trips, while keeping most of the advantages intact. Indeed, biology field trips conducted locally may even have additional benefits (Hale, 1986). For example, the proximity of the "field site" can facilitate multiple trips to a familiar location. Multiple trips can allow repeated sampling of the same population, tracking seasonal changes, and

day environment—organisms and patterns to which they were oblivious until the field trip. While field trips of any type may increase awareness (Klepper, 1990), observing nature at work right outside the classroom makes a lasting impression.

What the students accomplish during these campus field trips depends on the nature, level, and goals of the course, and how much course time the instructor wants to devote to field trips. To illustrate the flexibility of campus field trips for meeting a course's goals, I will describe the field trips I incorporated into two classes as a teaching assistant at UC-Davis. The first example is the laboratory portion of an introductory core course in biology. In the lab, students learn to appreciate and identify animal diversity, and understand the processes that gave rise to this diversity. I designed



Biology students can take advantage of studies in the field without ever leaving campus.

the field trip for this course to help students:

- ▲ review the major groups of animals for which they were responsible, as well as the characteristics that distinguish these groups;
- ▲ observe the animals and their behavior in their natural habitat;
- ▲ connect behavior and morphology to the animal's lifestyle; and
- ▲ discuss the role evolution played in these three items.

The field trips themselves were relatively unstructured, and consisted of a group walk through campus, stopping

at specific sites, discovering and discussing all the way. I expected individual students or groups of students to find representatives of as many animal taxa as they could, and then discuss ideas relevant to the animals that they found. For instance, the discovery of an earthworm might lead to discussions of annelid characteristics, specific adaptations for its subterranean lifestyle, and its feeding and reproductive behavior. The first stop invariably involved the tree by the bike racks right outside the building. We usually found individuals of at least seven classes of animals representing four phyla (*i.e.*, *Annelida*, *Arthropoda*,

Chordata, and *Mollusca*). Discussion topics during the trips varied from specific problems students were having with the material (*e.g.* "I don't understand why this is a gastropod") to more general issues such as conservation and biological control (*e.g.* "Why are there so many mosquitofish in this pond?").

The low level of structure on these field trips allowed for each excursion to develop around the particular observations the students made, and the particular problems they had. However, one could easily incorporate more structure into the trip design by using a more project-oriented approach. I illustrate this approach in the next example.

For an upper-level course in ecology, I designed field trips differently, with the trips being more research-project oriented. These trips introduced students to field ecology methods, had them consider the importance of experimental design, and helped them understand concepts from lecture through firsthand experience. We held the trips in the "arboretum," a planted area around a creek that runs right through campus. On the field trips, the students broke up into small groups, with each group being assigned one of several possible projects. Projects included determining species-area curves and relating the results to reserve design, calculating and interpreting species diversity indices for different habitats, and testing foraging behavior theory on ducks. Interesting discussions often developed when students tried to apply general terms such as "competition" and "diversity" to the specific situations they observed, or when the unexpected happened (*e.g.* gulls sometimes competed with the ducks for food during the experiments). Also, some groups had to modify their methods when the first attempt didn't work, and hence they learned about how real field studies develop. During the following week's discussion, students presented their

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projects and results to the rest of the class.

We completed both courses' field trips within one hour, and neither field trip required a tremendous amount of planning beforehand. Costs were extremely low for both courses; the introductory course field trips were free, and the ecology field trips only needed a loaf of bread for the ducks and a few copies of project descriptions. Maybe

overall time investment is relatively small, so it is easy to try different ideas and let students provide feedback (either directly or indirectly) on what works the best. Having a backup plan in case of bad weather is also a good idea; the very nature of campus field trips makes changing plans less complicated than for off-campus trips (Hale, 1986).

Although this paper describes trips

be a useful supplement, and can open up additional teaching possibilities. Either way, campus field trips are a valuable teaching tool that will add an additional spark to a course for both the students and the teacher. □

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- Another great benefit of campus field trips is the effect they have on students' awareness of their surroundings.*
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- most importantly, both trips occurred in the discussion or lab sections of large courses (introductory biology has 300-400 students and ecology has over 100) and were led by a teaching assistant. While the sections typically have 20-30 students in them, more students could easily be handled with the group project format (Beiersdorfer and Davis, 1994).
- Student feedback on the field trips has been extremely favorable. In both courses, students learned the class material in a fun setting and became more aware of the world around them.
- An instructor planning a campus field trip should follow the guidelines suggested for traditional field trips (e.g. Klepper, 1990; Beiersdorfer and Davis, 1994). In particular, an instructor should spend some time scouting the campus for possibilities, and try to match the projects and expectations with the amount of time allotted. The
- used in biology courses, other disciplines could also benefit from campus field trips. For example, Bart (1991) described a geology field trip where students develop a topographical map of a campus grassy area. Jones' (1993) students in freshman-level astronomy and earth sciences classes collected micrometeorites falling onto campus buildings. Physics classes can visit campus physics laboratories and machine shops (Paldy, 1988, 1993). Other subjects have other opportunities on campus.
- Obviously, off-campus field trips can also be a very exciting and rewarding experience (Grove, 1984; Stephens et al., 1988; Ferrier, 1989; Fisher, 1989). However, off-campus field trips may not always be possible, and in these instances, on-campus field trips can provide an effective alternative. Even for courses that do include off-campus field trips, on-campus trips can