CALLS for curriculum reform in secondary and undergraduate education emphasize the need to teach science in a “hands-on,” “minds-on” investigative way that engages students in active inquiry. For example, a National Science Foundation-sponsored panel of scientists, mathematicians and engineers recommended that the focus of new programs “…be on open-ended activities that enhance skills of observation and discovery, hypothesis formation, testing and evaluation (Division of Undergraduate Science, Engineering, and Mathematics Education, 1990). In a similar vein, the American Association for the Advancement of Science (1990) recommended that “…science should be taught as science is practiced.”

Many of the “How-To-Do-It” lessons published in this journal are excellent examples of how to implement open-ended inquiry with its emphasis on hypothesis generation and test. For example, Johnson (1998) presented an active inquiry lesson on cellular respiration. Favero (1998) used an open-ended lesson on potato chip “double-dipping” to introduce the scientific method. And Maret & Rissing (1998) used a learning cycle approach with its instructional phases of exploration, term introduction and concept application to introduce the concepts of natural selection and genetic drift.

Although our department’s efforts at curriculum reform embody the goal of “teaching science as science is practiced,” and several of our courses utilize the learning cycle teaching methodology, we have found that many of our new graduate teaching assistants have little, if any, experience in inquiry teaching. Therefore, when they first attempt to teach inquiry lessons, they often encounter classroom management problems. The purpose of this article is to briefly describe how some of these problems have been identified and to suggest solutions. The intent is to provide teachers new to the inquiry classroom with a list of potential problems and solutions so that they can either avoid such problems altogether, or reduce their severity.

Identifying Classroom Management Problems

Each semester we offer a nonmajors biology course that enrolls in excess of 700 students (as previously described in Lawson, Rissing & Faeth 1990). The course is traditional in the sense that it consists of three 50-minute lectures and one 2-hour lab each week. The lectures are delivered by experienced professors while most of the labs are guided by inexperienced teaching assistants. The course is nontraditional in a number of ways, but perhaps what separates it from most introductory courses is its focus on inquiry. Students first encounter new topics during lab and field inquiries (a list of titles appears in Table 1). Then the topics are discussed in more depth during the lectures. In other words, the lab and field inquiries are designed to incorporate the exploration and term introduction phases of learning cycles while the lectures incorporate the concept application phase. Another nontraditional aspect of the course is our use of a test of scientific reasoning (see Lawson 1994 or contact author for a copy) as a pre- and post-test to monitor our effectiveness at producing reasoning gains.

During a recent semester, 10 new teaching assistants who had just completed their first semester guiding the lab and field inquiries were asked to

Table 1. Titles of lab and field inquiries directed by teaching assistants.

- What Can Be Inferred From Animal Structure?
- How Smart Are Animals?
- What Do Fossils Tell Us About Life in the Past?
- Has Homo sapiens Existed for a Relatively Long Time?
- How Do Species Evolve?
- What Causes Intraspecific Variation?
- What Determines Specific Characteristics in Fruit Flies?
- Which Human Characteristics Covary?
- What Adaptations Do Plants Have for Life in the Desert? (Field Trip)
- What Variables Affect the Rate of Photosynthesis?
- How Does the Environment Affect the Distribution of Organisms? (Field Trip)
- What Variables Affect the Passage of Molecules Through Cell Membranes?
- How Does Water Rise in Vascular Plants?
- How Can a Burning Candle Cause Water to Rise?