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Engaging Biology Students Through Informal Summer Field Experiences

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Abstract

Informal education occurs outside the confines of the classroom and frequently involves collaboration between formal institutions of learning and organizations such as museum, zoos and nature centers. This paper describes a collaboration between Housatonic Community College, in Bridgeport Connecticut and the Connecticut Audubon Society (USA). The focus of this collaboration is a longitudinal study of Painted Turtles (Chrysemys picta) from a pond in the Roy and Margot Larsen Sanctuary of the Connecticut Audubon Society. A primary goal of this experience is to have students design and execute a field study of the Painted Turtle. Students learn techniques of sampling and collecting the type of data a biologist would require in assessing a population of animals. In addition to these tangible and assessable skills students also take away intangibles such as a sense of responsibility by arriving at the project site in a consistent and timely manner and the cooperative skills of working together as a team.

Keywords: *Informal Education, Field Studies;*

1. Introduction

Informal education is defined as education that occurs outside the confines of the classroom. Many community organizations are involved in informal learning and education. A variety of organizations including museums, nature centers, zoos, conservation organizations etc. offer science students and faculty, informal education experiences. Such experiences frequently involve collaboration with formal institutions of learning. The National Science Teachers Association (NSTA) has produced two position papers on the role and importance of informal science learning opportunities [1,2]. Yager and Falk [3] state that 75% of the Nobel Laureates reported that their interest in science was first ignited in informal environments. Informal educational experiences allow students to explore science and nature in a way they could never do in the lecture hall or teaching laboratory. Informal learning experiences are often associated with hands-on and experiential learning, particularly in the sciences. These experiences are typically voluntary, learner motivated and at least in part guided by learner interest [1]. College science students spend relatively short periods of time in a classroom either in formal lecture or lab activities. Very often this is not enough time to adequately learn science skills and adapt those skills to real life situations. Students get the false impression that science occurs in the short intervals of time that it takes to complete an in-class lab activity. We can give students a sense that science is a time consuming pursuit and science research occurs over long time periods by having them do semester long science activities and investigations. Even this does not give students the impression that most science research is long-term and often longitudinal in nature.

2. Informal Learning in a Science Environment

In order to offer students an informal science education experience, collaboration between the Connecticut Audubon Society and Housatonic Community College in Bridgeport CT was developed. A total of 20 students have been involved in this 7-year study of the Painted Turtle (*Chrysemys picta*). Each summer, for the past seven summers students have slowly and methodically built a picture of the population dynamics and other aspects of the life history of the Painted Turtle. Although many students express an interest in pursuing Bachelors level studies in biology, zoology and environmental science, most students have never experienced doing biological fieldwork. Under my direction students undertake a field project, the focus of which is an assessment of the Painted Turtle population, found within the Roy and Margo Larsen Sanctuary of the Connecticut Audubon Society. The summer field experience has several goals:

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- Introduce a group of community college students to methods of conducting fieldwork;
- Have students collect data on a population of Painted Turtles;
- Learn techniques of collecting and gathering the data a biologist would require to assess a population of animals;
- Develop data recording skills including the development and use of data sheets appropriate to the project;
- Become proficient in the use of measuring devices including calipers and weighing scales.

3. The Project

Working since 2010 our "research group" has developed a picture of the population dynamics and select life history aspects of the Painted Turtle. Students involved with this project are a self-identified group chosen from general biology classes. Prior to taking students into the field, a formal classroom session is required of all students. During this session the scope of the project is discussed and safety in the field is stressed. The Painted Turtles are part of a long-term study and this requires a discussion of what constitutes a longitudinal study, life history and population dynamics. Once students understand these concepts they can decide on what data to collect and how to go about doing it.

3.1 The Field Site

The site of this project is the Farm Pond located within the Roy and Margot Larsen Sanctuary a 155-acre nature preserve and wildlife sanctuary owned by the Connecticut Audubon Society. The Sanctuary consists of hiking trails, forests, streams and ponds. Although several of the ponds have Painted Turtles, the Farm Pond was chosen due to ease of access. The Pond was originally created as habitat for waterfowl. It has two streams, which act as inlets and one which functions as an outlet. During the summer months the pond experiences high growth of duckweed, giving it a green appearance. The Farm Pond has an observation platform and serves as an educational resource for Connecticut Audubon Society programs**.**

3.2 Day 1 in the Field

It is important that the students guide the project. This gives students an immediate sense of ownership and motivates them to come to the field in a consistent and timely basis. The students walk through the field site. This leads to a discussion of what type of data the group should gather, and where the collecting equipment should be situated. This is done after students have spent some hours observing the turtles. A hallmark of informal education is that it is learner motivated and guided by learner interest [1].

3.3 Day 2 and Beyond

With the second fieldtrip, collecting of data begins in earnest. The students are shown how to trap and handle the turtles, determine their gender, weigh and measure them, so that students are not hurt and animals are treated humanely. In addition each turtle is marked using a scheme that allows us to identify individuals if they are recaptured. All turtles are returned unharmed to the collection site. The process is repeated on a daily basis for the duration of the summer. Students have access to data collected during previous summers. Discussions of how to handle and manipulate the data are always part of the conversation. These data are often used in my biology classes as an introduction to data handling, graphing etc.

4. The Take-Away

Students have to commit to working in the field several days per week, throughout the summer months. They experience real world applications of biology and put to practice what they learn in a classroom. Some of the behaviors and skills that students take away from such experiences include:

- A sense of responsibility by arriving at the project site in a consistent and timely manner;
- Cooperative skills by working together as a team. Students cooperate with each other in collecting and recording data. No individual serves as a permanent "secretary" simply recording data. Students are actively engaged in all aspects of the project;

- Handling animals in a manner that is humane for the animal and safe for both the animal and the student;
- Data handling and analysis;
- The field site is a public access area. Members of the public frequently hike through the area and ask about our work. Students develop skills explaining their work to the layperson.

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