Chapter 5
"I Want to Be a Herpetologist!": Using the Study of Reptiles and Amphibians to Engage Youth in STEM

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ABSTRACT

The out-of-doors provides unique opportunities to engage youth in the natural environment and to teach STEM content in a more informal setting. In this chapter, the authors share findings from a study focused on elementary-aged students as they participated in a week-long herpetology (the study of reptiles and amphibians) program at an environmental education center. Informal science education centers provide a context for participants to use STEM to address local, place-based issues, exercise agency in how they practice autonomy within learning activities, and broaden their perceptions of what it means to "do science" through participation in normative scientific practices. However, there is a dearth of literature addressing the use and benefits of environmental education. Using a lens focused on agency and normative scientific practices, the authors examine the ways engagement in environmental education impact participants' perceptions of their abilities to engage in STEM-related practices.

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INTRODUCTION

Using informal, place-based education enables participants to study the environment and to view themselves as contributors to its well-being (Sobel, 2004). Through studies of the local environment, participants use science, technology, engineering, and mathematics (STEM) to learn more about problems that they may be able to address in both the present and in their future careers. In this chapter, the authors share findings from a case study focused on children as they participated in a week-long herpetology camp at an environmental education center. Focusing on agency and normative scientific practices, the authors examine the ways that participants' perceptions of their abilities to engage in STEM-related practices are impacted through engagement in environmental education.

Informal STEM Education Centers

Informal STEM education centers engage the public in STEM in an out-of-school setting, which may include museums, nature centers, parks, and zoos (Dierking, Falk, Rennie, Anderson, & Ellenbogen, 2003). Participation in informal science education is voluntary, and thus participants tend to have a higher rate of interest and involvement in the area of study. The activities occurring at informal education centers are not generally considered part of a school curriculum; in addition, informal learning environments provide more opportunities to engage with peers and utilize STEM practices, thus increasing student interest and their likelihood to pursue STEM-related careers (Roberts, Jackson, & Mohr-Schroeder, 2018).

As noted by Dorsen, Carlson, and Goodyear (2006), "young people cannot choose a specific STEM career or field of study if they do not know of its existence" (p. 7). Therefore, informal science education centers, including those focused on environmental education, offer opportunities to engage learners with STEM-related content in ways that school science cannot. For example, in the herpetology program under investigation, participants learned to collect measurement data on reptiles and amphibians using calipers and spring scales. Participants learned scientific terminology while they learned the anatomy and behavior of reptiles and amphibians, the names of the tools used, and about the environment in which the organisms live. The students engaged in engineering projects as they designed various experiments to collect scientific data of their choice, and they used technology to both collect data through photography and share data via a citizen science database. Because herpetological species often serve as wellness indicators for the local environment, examining the species and populations within the environmental education site provided opportunities to look at environmental health and ways that the participants and other individuals could positively impact environmental health.