Chapter 9
Bee Pollination

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EXECUTIVE SUMMARY

The purpose of the chapter is to provide an exemplar of an inquiry-based unit on pollination for designing and implementing constructivist instructional practices while simultaneously providing outstanding teacher preparation. The unit on pollination was developed by preservice teachers through a partnership between the Monmouth Conservation Foundation and the Monmouth University School of Education. Through collective action, these institutions were able to enhance student learning on a vital part of the science curriculum, provide a rich clinical experience for pre-service teachers, and to familiarize teachers with a more constructivist approach to pre-school science instruction.

INTRODUCTION

Science education for preschool children has recently received considerable attention. Recent research has shown that children who engage in scientific exploration in early childhood have a better understanding of science concepts later in life (Patrick, 2009). Children are natural scientists. They are inquisitive and enthusiastic with a predisposition for investigation. Children live in a world of things that are constantly beckoning to them: some living, some hard and cold, some large, some metallic,

and some dirty (Suransky,1982). Some refer to it as an innate curiosity to discover everything within their reach (Bredekamp & Copple, 2009, Piaget, 1955). Preschool children engage in the study of science long before they have entered any school building (Grennon-Brooks, 2011). As soon as children realize that they can discover for themselves, their first encounter with science has occurred (Bredekamp, 2014; Tu, 2006).

Current research indicates that young children have the capacity for constructing conceptual learning and the ability to use the practices of reasoning and inquiry (NRC 2007, 2012). Many educators tend to underestimate children's capacities to learn scientific concepts and practices in the early years; therefore, young children are not provided the opportunities for them to explore science-based understanding (NRC 2007). Additionally, when children are directly engaged in authentic science explorations, they are able remain focused for longer periods of time than educators typically estimate. Effective science investigations can deeply engage young children for extended periods of time beyond a single activity or session.

Despite its importance, teachers typically do not provide high-quality science experiences in early childhood classrooms (Gerde, Schacter, & Wasik, 2013; Fitzgerald & Schneider, 2013; Tu, 2006). Many early educators are hesitant about introducing science in their own classrooms, citing that they themselves did not enjoy studying science as students, and they feel ill-prepared to teach it (Conezio & French, 2002). As a result, many teachers teach science through a series of isolated experiments without any connection to a meaningful and broader science curriculum. In one study, preschool teachers reported that the science curriculum consisted of children watering plants and displaying a random assortment of stones and shells in the back of their classrooms (Fitzgerald & Schneider, 2013).

Children have the capacity to engage in scientific practices and develop understanding at a conceptual level. Current research shows that young children have the capacity for conceptual learning and the ability to use the skills of reasoning and inquiry as they investigate how the world works (NRC 2007, NRC 2012). For example, their play with blocks, water, and sand shares some science-relevant characteristics. Additionally, young children can learn to organize and communicate their learning, and differentiate between concrete and abstract ideas (Carey 1985). Adults who engage children in science inquiry through the process of asking questions, investigating, and constructing explanations can provide developmentally appropriate environments that take advantage of what children do as part of their everyday life prior to entering formal school settings (NAEYC 2013, p. 17; NRC 2007). These skills and abilities can provide helpful starting points for developing scientific reasoning (NRC 2007, p. 82).

Therefore, it is not surprising that several studies have discovered that preschool students are not ready to learn science when they enter kindergarten (Conezio &