

# Engineering in an After– School Integrated STREAM Project: Evidence of Learning

**Vanessa Morrison**

*Adrian College, USA*

**Andrea R. Milner**

*Adrian College, USA*

**Natasha Wetzel**

*Adrian College, USA*

## **EXECUTIVE SUMMARY**

*It is widely accepted that students' informal learning outside of the classroom can influence their learning in the classroom. Thus, many elementary teachers are considering a wider range of approaches and experiences associated with the STEM disciplines as they incorporate expectations of the Next Generation Science Standards, as well as the learning goals envisioned in A Framework for K-12 Science Education. This chapter focuses on engineering practices enacted in an after-school program as exhibited by third grade students. It explores the interdisciplinary learning of students as they planned and constructed artifacts from teacher created, ill-structured engineering challenges within small collaborative teams.*

## INTRODUCTION

Sometime after school dismissal, a trio of third graders are contemplating their ideas as they huddle over sheets of sketches individually composed moments earlier.

*S1: Let's pick the best ideas. [Pointing to walls on friend's illustration of a simple animal shelter]; What is this?*

*S2: Construction paper walls.*

*S1: [Brief Pause]. I don't think we should use construction paper.*

*[Directs question to teacher]. Do you think we should use construction paper for the walls?*

*T: What do you think? What do you know about paper? Talk to your friends about it.*

*S3: Well ... since it has to be outdoor, when it ummm ... rains, the paper will get soggy and fall apart.*

*S2: But it (construction paper) will make the shelter pretty 'cause of the colors.*

*S1: We can still make it pretty using other stuff like play doh ... that's what I have on my drawing.*

*S3: For the roof, we can use wax paper or dixie cups ... dixie cup is made to hold water. What you guys think?*

*All: Dixie cups.*

*S2: Okay, but let's give it lots of color ... I wonder if animals can see in color?*

*T: I heard a lot of good ideas ... let's test some of these ... I see a lot of different supplies on the table you can use for the walls and roof. Why don't you test some and see which ones you think are best suited ...*

*S1: Yeah [reaches for a dixie cup], we can put some water on them ...*

*All: [Spreads out supplies on the table as S1 returns with a cup of water].*

*S3: [Pours a spoonful of water onto construction paper], see it soaks through like I said.*

*S1: Pulls apart and flattens a dixie cup], hear ... here.*

*S3: [Pours a spoonful of water onto the flatten dixie cup and the small group watched it trickled down, running off the edge of the cup – and repeated the process on a piece of wax paper].*

*All: Let's use dixie cup for the roof.*

*S2: Yes ... and build it out of play doh so it looks pretty.*

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