Summer 8-15-2016

Environmental education in a dual immersion classroom

Annaka Marie Larson
Hamline University, alarson17@hamline.edu

ENVIRONMENTAL EDUCATION

IN A DUAL IMMERSION CLASSROOM

by

Annaka Larson

A capstone submitted in partial fulfillment of the requirements for the degree of Masters of Arts in Teaching.

Hamline University

Saint Paul, Minnesota

August 2016

Primary Advisor: Laura Halldin
Secondary Advisor: Amanda Herrera-Gundale
Peer Reviewer: Brigid Berger

To Andy, thank you for the walks.

To all my teachers, thank you for the wonder.

TABLE OF CONTENTS

TABLE OF FIGURES

CHAPTER ONE

Introduction

As I round up my first graders from the playground each day, reluctant to return to school, I am reminded again and again how captivating the outdoors are for us all, yet the demands of our schedule require we come in at 1:05 sharp. I love the natural world around our school just as much as my students do, and my mind has been preoccupied with engaging them through the outdoor experiences they clearly crave. How can we better connect our surroundings to what we are learning in our bilingual Spanish classroom? *How can environmental education curricula be implemented in dual immersion classrooms?* To explain why I am passionate about these seemingly disparate interests, I will describe my own education with the natural world, and then my experiences learning Spanish in Latin America. I will conclude with my realizations about the limitations of my current teaching in these two areas and why I seek to connect them through this capstone.

My Environmental Education

"Hmmm, will this be enough braids to decorate the fort, you think?" asked my friend as we busily wound the strands together, uniting the different colors of yarns. Even while working quietly in our small country schoolroom, our six-year-old minds fixated on plans for recess. In our small lean-to, cobbled together from fallen tree limbs and pine

boughs, we crafted elaborate imaginative games that were a fantastic blend of what we were reading, learning, or creating inside the school and what we had scavenged from our little wood: empty walnut halves, field corn, skunk cabbage leaves, and precious pinecones, which served as currency in our arboreal economy. The teachers knew about and supported our imaginative play; they helped us resolve disputes that inevitably arose ("That's our fort!" "No, we made it first!") and encouraged us to find cooperative solutions. When a small patch of poison ivy was discovered, instead of declaring the forest off limits, the teachers taught us how to identify and avoid the plant, holding up an example of the leaves that had been carefully collected in a plastic bag.

The kids at my school were, for the most part, primed to thrive in this unstructured natural play. As middle class white kids from small-town Minnesota, many spent their weekends camping or at the family cabin. They grew up in families that knew the Minnesota landscape as well as their own homes; for my part, I had a father who could explain how to tell different oak species apart and a mother who would rush to the window when we had a new arrival at the birdfeeder. I grew up learning to use the world around me in as many ways as I could, and my parents encouraged me in my inventiveness. In summer, my friends and I could be found digging in what we called "the dirt hill," which was a mound of dirt excavated to build some nearby houses, covered over in prairie grasses. Gouging away with sticks, we found veins of clay and made our own dirt pottery, leaving it in the sun to dry and coloring it with dandelions and red petunia petals. In winter, we cleared snow off the ice of our small pond and made little houses under the fallen cattails, returning home covered in snow and seeds. There were certainly rules about where we could roam and what we could do, but within those

boundaries we had ample area to explore. All through my childhood ran this thread of exploration, and I owe my knowledge and love of nature to these early experiences, made possible by supportive parents and a rural setting.

As I grew older, and had to spend more and more time within the classroom, this love for the outdoors was somewhat forgotten, but I picked it up again in college. At my small liberal arts school, we had a large arboretum and I took advantage of walking, biking, picnicking, and skiing through it. There was even a student-run nature day camp, which I participated in as a child, and I jumped at the chance to complete the circle and join the camp staff. For two summers I planned nature walks, investigated owl pellets, captured fireflies, and reveled in the wonder of bringing children and nature together. Some of my fondest college memories are the unplanned moments when a child in our camp discovered something amazing, like capturing fireflies in the grass or the everyday tragedy of a dead baby bird. I learned then what my parents and teachers already knew: that nature is a powerful and effective teacher from which all children can benefit.

My Latin American Education

All the off-campus studies coordinator said was, "I think this program in Central America could be a good fit for you," but it led me to follow another thread in a completely unexpected direction. I had studied Spanish since grade school, and enjoyed speaking the language but had no plans to make it central to my life. The coordinator, knowing both my language background and interest in social justice, recommended a program entitled "Sustainable Development and Social Change in Central America," which traveled through Guatemala, El Salvador, and Nicaragua. Through my time on this program, I explored a wholly new landscape of jagged green mountains and dense forest,

as well as a new culture in which I was an outsider. As a tall white woman, I stood out and came to realize that even if I spoke the language, I was not fluent in how to operate in the culture. I learned, clumsily, to give my host mother a kiss on the cheek when I arrived home, and gradually began to understand when to say "buen provecho," the Spanish equivalent of "bon appétit."

Everywhere I went, both in Central America and later in Ecuador, I found myself making connections most easily with the children I encountered. I played soccer with my little host brother, taught goofy songs by firelight to a group of kids in a tiny village, and baked 200 chocolate chip cookies to share with students on my last day. The constant Spanish conversation gave me plentiful opportunities to practice and gain confidence in my speaking abilities that I never could have gotten from undergraduate literature classes.

Moreover, I found myself drawn into the history of Central America, and particularly the region's indigenous communities. I decided to focus my history major on Latin America, and ended up writing my senior thesis about the role of Guatemalan indigenous culture and landscape in creating national pride during the 1940s. One of the most fascinating aspects of this research was learning how certain intellectuals in the Guatemalan government were advocating for first language literacy: basically, that Mayan communities should not be forced to learn to read and learn Spanish at the same time, but rather should read first in their native languages and only then start to apply reading to Spanish. Little did I know at the time how significant that seemingly disconnected bit of trivia would be to my future career.

After a year working as a volunteer coordinator through AmeriCorps, I wanted a job in which I was directly serving people and seeing the fruits of my labors. With my

Spanish background, I ended up finding a position as a bilingual paraprofessional at a school in North Minneapolis. The school had a program of Native Language Literacy, through which students who entered kindergarten speaking Spanish could learn to read and write in their native language first. As someone who learned Spanish as a second language speaker, it was fascinating to learn how to teach reading in another language. Moreover, the progress students were making was a daily inspiration. Instead of being frustrated, the kindergartners I worked with had the necessary vocabulary and language structures to really sink their teeth into reading. The reaction of the families was even more heartening; they were so supportive of our instruction and thankful to have staff at their child's school with whom they could easily communicate. By bringing Spanish into the classroom as part of the curriculum, the families' strengths complemented the instruction students received at school. Once I saw the amazing potential of bilingual education for Spanish-speaking students, I was hooked, and knew that was where I wanted to be.

My Education in Teaching

Since coming to Saint Paul Public Schools as a teacher, I have had the great honor of teaching first grade in bilingual Spanish programs, serving wonderfully creative and caring students. Most have roots in Mexico, but Guatemala, Puerto Rico, Honduras, and other Latin American nations are represented as well. I am continually grateful to the level of support I receive from the families of my students; they care deeply about their children's education, have great respect for their children's teachers, and impart that focus on learning to their children.

As part of their general zeal to learn, many of my students are intensely curious about the natural world. When it is warm, they scour the field for tiny flowers, presenting me with a mini-bouquet at the close of recess. In fall, they try to collect so many leaves that I institute a quota of how many can be brought inside. When snow has freshly fallen, they might track the prints of a dog that walked by the playground or examine the snowflakes that land on my black gloves. Yet many of them have startling gaps or misconceptions about the natural world; when we discussed photos of a mountain stream, I was aghast that multiple students thought the orange and yellow leaves on the trees meant it was spring, not autumn. Another striking incident was the day that students made dioramas of an animal habitat for our science curriculum. One boy chose to make a home for a camel that consisted entirely of gravel, and when asked what the camel would eat, he answered confidently, "Sand!" Clearly, there is room for improvement in the area of environmental education in my classroom.

Connections

At the outset, these two interests, in environmental education and bilingual education, seem disconnected, or even at odds. When looking for jobs, I could easily find a school with an environmental focus, or I could apply to a school with a bilingual program, but there are very few that do both at the same time. As I reflected on why both types of pedagogy mattered so much to me, I realized it came down to my foundational educational experiences and my beliefs about learning. Experiential learning, especially when it's connected to the place a child lives, is crucial for developing knowledge and interest in the natural world. I want my students to be able to use Spanish to describe the world around them. I believe that all children deserve access to a rich curriculum that

validates and enhances their lived experiences. Environmental education should not be a privilege given only to those who have the means to visit the natural places we call "wilderness" because the city is full of nature, too. I want all our students to view themselves as scientists and naturalists and feel comfortable observing the world around them. I believe my students will be more motivated to learn a language if it allows them access to knowledge and experiences that matter to them. And I believe I am a better teacher when I am teaching something that also matters deeply to me.

Conclusion

I have developed two strong passions, environmental education and bilingual education, springing from my experiences inside and outside the classroom. My desire to improve educational outcomes for my class has led me to seek out a way to unite these interests, and moreover, discover how the goals and methods of these seemingly separate types of education could support each other by beginning to answer the question, *how can environmental education curricula be implemented in dual immersion classrooms?* In the next chapter, I will explain the current state of research that forms the foundations for environmental and bilingual education.

CHAPTER TWO

Literature Review

In the first chapter, I outlined my personal and professional interests that have led me to the question, *How can environmental education curricula be implemented in dual immersion classrooms?* This chapter will explore the research background for these areas of study. The first section will provide a foundation on bilingual programs, focusing on dual immersion models specifically, and then explore the benefits and challenges presented by dual immersion. I will also outline best practices for planning lessons in dual immersion programs. The second section will explore environmental education, highlighting the most relevant subfields of the discipline, effective pedagogy, and commonly implemented teaching strategies. The section will end by discussing one of the most well-known environmental education curricula, Project WILD. Finally, I will discuss the intersections between bilingual education and environmental education, and make the case for implementing environmental education in a dual immersion classroom.

Bilingual Education

Overview. Bilingual education refers to a host of interconnected, and at times competing, descriptors, acronyms, and program types regarding instruction involving two languages. Broadly, bilingual education is defined in opposition to "English only" instruction and can include a variety of different program models, with different goals

and methods (Thomas & Collier, 1997). In the United States, most bilingual programs involve English and another language, which is often referred to as the partner or target language.

These programs can be grouped into two basic categories. The first type is known as subtractive; the goal is to decrease instructional reliance on a student's native language and increase their English proficiency. Transitional bilingual programs fall into this category because students begin schooling in their native language and switch as soon as possible to English-only instruction. It is important to note that the goal of these programs, despite the inclusion of students' native language, is not bilingualism, but rather a rapid transition to English proficiency (Cummins, 2000; Freeman, Freeman & Mercuri, 2005).

By contrast, the other category of bilingual instruction is additive; these instructional models seek to foster bilingualism and biliteracy for the students in the program, not solely English proficiency (Cummins, 2000; Freeman et al., 2005). A few models fall into this category, and they differ by the population they serve. Immersion, one-way immersion, or enriched immersion all refer to programs where English-speaking students learn another language by being "immersed," receiving their early instruction only in the target language, and continuing on in both languages until at least sixth grade. The inverse of this model, called maintenance, late exit, or developmental bilingual, focuses solely on students who are native speakers of the target language. These programs follow a similar immersion trajectory as the one-way immersion schools, but are intended to maintain students' first language (Freeman et al., 2005). The final model is the dual or two-way immersion program. In this type of program, classes are comprised

of half English-speaking students and half native speakers of the partner language. The ultimate goal is for both populations of students to become bilingual and biliterate (Lessow-Hurley, 2009).

Bilingual education is not without critics. Some believe that bilingual education disrupts the process of acculturation and will lead to national disunity; politicians routinely propose establishing English as the official language of the United States (Flock, 2013). Certain states have enacted laws to reduce or eliminate bilingual programming: Arizona, Massachusetts, and California have all moved towards structured English immersion, an English-only class specifically designed for English Learners (Zehr, 2008). Several scholars have also condemned bilingual education's effectiveness. Rossell and Baker analyzed seventy-two studies that compared transitional bilingual programs with structured English immersion and found no evidence that transitional bilingual programs were more effective (1996). Nonetheless, it is important to recognize that Rossell and Baker's definition of effectiveness was entirely dependent on student performance in English and they assumed that the goal of all the educational programs examined was English proficiency (Rossell, 2005). Other researchers have also criticized the methods employed in this analysis. The only information Rossell and Baker used was whether the bilingual program did the same, better, or worse than the alternative, so it is difficult to understand the effect size (Krashen, 2009). The analysis also included many studies that looked at student achievement data from less than a year in the program: short-term, rather than long term, effects. When Greene looked at only those studies that lasted at least a year, the bilingual programs were shown to be more effective (1998). It is also interesting to note that Rossell and Baker do not include any dual immersion

programs in their analysis; their focus is on transitional bilingual education, although they use their findings to justify eliminating bilingual programs generally.

Other researchers who have compared effectiveness of the various program models for bilingual education have come to favor the dual immersion model. In an oft-cited report, Thomas and Collier examined performance of language-minority students from five large school districts across the country (1997). Through a large sample size, they were able to compare cohorts of students learning English who were from similar socioeconomic and linguistic backgrounds to see how groups in each type of program progressed relative to similar English speakers. In their report, students in dual immersion programs outperformed all other models, and even did better than the native English speakers.

Despite this, some researchers do see weaknesses in the dual immersion model. One of the most influential critiques within the field of bilingual education comes from Valdés (1997). She agrees that dual immersion helps move bilingual education away from a deficit model and towards a more positive view of bilingualism. However, in her view, the defining aspect of dual immersion—the combination of two populations of students to serve both group's needs—is also a serious weakness. Especially in the early grades, the language used must be modified to accommodate non-native speakers, so she worries that this would have a deleterious effect on the native speakers in the class, essentially privileging the needs of one group over the other. This privilege is also evident in the feedback these two groups of students receive: she notes that while it is expected that Spanish speakers will learn English and little fanfare is given to their bilingualism, English speakers are praised and thought of more highly for learning

Spanish. Finally, she contends that the study of a minority language by those in the majority does not automatically empower the speakers of the minority language, and can in some situations perpetuate inequalities between groups. Ultimately, she urges the practitioners of dual immersion to be cognizant of these potential pitfalls and plan their instruction carefully to provide an equitable education.

Dual immersion challenges. In dual immersion, two languages are employed for student instruction with the goal of bilingualism and biliteracy. Because of this, many researchers emphasize the importance of providing equal emphasis and equal resources in both languages. This must include materials, posted examples of student work, encouragement from the teacher, and rigorous content (Hadi-Tabassum, 2004). Dual immersion explicitly requires a dual emphasis.

Creating equal experiences with both languages, though, can be difficult to accomplish in the classroom. Despite the best efforts of teachers and administrators in the school they observed, Amrein and Peña (2000) identified three different types of imbalances in a dual immersion program in Arizona, described as instructional, resource, and student asymmetry. Instructional asymmetry resulted from teacher behaviors and attitudes: while all the Spanish teachers were bilingual, and at times used English to support the English-speakers in the classroom, none of the English teachers were bilingual, eliminating the equivalent support for Spanish-speakers. Secondly, there was also marked asymmetry of resources in the program. While the English classrooms were stocked exclusively with English materials, maintaining the separation of languages advocated by Hadi-Tabassum (2004) and others, the Spanish classroom contained a large number of bilingual resources, again leading to language supports for English that were

unavailable for Spanish. No matter what language is being taught in a dual immersion program, the available resources are often vastly outnumbered by English materials, simply due to the prevalence of English in American culture. Moreover, what is available is often more expensive than comparable materials in English, putting further burdens on the dual immersion school. The third imbalance, student asymmetry, was evident in the ratios of Spanish to English speakers; the school observed had a persistent lack of English speakers in their program, preventing it from creating the intended 50/50 ratio. Students also created cliques within the class by language and those students with adequate skills in both languages chose to associate more with English speakers, furthering their assimilation into the dominant language group. Overall, this study illuminates some of the difficulties of creating equal footing for both languages in a dual immersion program.

Moreover, dual immersion programs by their very nature bring together classrooms of students that are ethnically, linguistically, economically, and culturally diverse. Even given a classroom that has corrected the asymmetries noted by Amrein and Peña, equality of resources does not necessarily lead to equitable outcomes, because of the influence of wider inequalities in American life as a whole. Some researchers, therefore, present social justice as an essential part of effective bilingual pedagogy (García & Baetehns Beardsmore, 2009). As Schecter and Cummins (2003, p. 9) assert, in diverse classrooms, "where social inequality inevitably exists, these interactions [between students] are never neutral," but can either question existing power structures or reinforce the status quo.

Numerous studies point to the power imbalances that can occur in dual immersion classrooms. One study by Potowski (2004) looked at student talk in Spanish in a fifth-

grade dual immersion classroom. She found that, while Spanish was used for academic work and interactions with the teacher, for student-to-student conversations, especially non-academic ones, the fifth-graders favored English; the dominance of English outside the school affected language use inside it. Simply being with Spanish speakers was not a factor in increasing Spanish use, but student beliefs about the importance of Spanish did: those who thought the language was important used it more in the classroom. Morren López (2012) examined the beliefs about languages of first-grade students in a dual immersion program. She too found that the prevalence of English had already seeped into students' beliefs about school: while some students valued being bilingual and enjoyed using both languages, others had already developed a preference for English over Spanish. Even with very young students, biases towards English can already be deeply ingrained.

In addition to linguistic equity, socioeconomic issues also come into play in the dual immersion classroom. In observing one second-grade classroom for a full school year, Palmer (2009) noted that the middle-class students asserted themselves much more forcefully and more often than their working-class peers. This effect was more pronounced when a teacher was unaware of the English dominance, but was also ameliorated when instruction explicitly supported more equitable classroom talk. Careful planning by teachers and administrators is required for dual immersion programs to live up to the goals of bilingualism and biliteracy without unintentionally perpetuating linguistic and socioeconomic inequalities.

Best practices in dual immersion. In order to meet the needs of students in dual immersion classrooms, teachers must take extra care in planning instruction (Carrera-

Carrillo & Rickert Smith, 2006). Hamayan, Genesee and Cloud refer to this as "double planning" because one "need[s] to plan for both language and content learning to occur in tandem" (2013, p. 88). Another important consideration in dual immersion is that two different populations are learning together. Native speakers of the non-English language have some vocabulary and language structures to aid understanding of new concepts. Native English speakers, however, will need extra support to be able to understand new concepts in the non-English language (Hamayan et al., 2013).

These researchers advocate creating two types of objectives: content objectives, based on the standards and the subject being taught, and language objectives, which include formal and informal oral language skills. One important support for language objectives is the set of language development standards created by WIDA, a nonprofit consortium focused on language learners. WIDA now offers both English and Spanish standards around academic language development (2013). Standards like these can help teachers evaluate the language demands of a task and order their instruction so that the objectives build from basic to more sophisticated language.

This focus on language does not imply that content loses importance. In bilingual programs thematic instruction often serves to support both types of learning. Hamayan et al. emphasize that instruction should be integrated because "it is easiest to learn language and to learn about language through another content area" (2013, p. 164). The Center for Advanced Research on Language Acquisition at the University of Minnesota supports research and training in content-based instruction and argues that language is best taught "through a framework that focuses on complex and authentic content" (2014).

In teaching new concepts and new language at the same time, teacher-directed lessons or premade worksheets simply will not work. Hamayan et al. favor active learning strategies, such as realia, hands-on activities with objects, manipulatives, and demonstrations, because they help students understand the content regardless of language ability and also provide opportunities for language practice (2013). Children in immersion need "plenty of support through manipulatives, pictures, real objects, and graphic organizers, showing as well as telling. This type of instruction is best for all students, but it is essential for students learning in a second language" (Carrera-Carillo & Smith, 2006, p. 31). To reiterate, experiential, hands-on learning is even more important in a bilingual setting.

Implications for my research. In this section, I gave an overview of the types of bilingual programs that exist, with a focus on the program model in which I teach: dual immersion. I then discussed some of the challenges in creating an equitable learning environment in a dual immersion program, and concluded with research-based best practices for dual immersion. What I read drove home the importance of careful planning for my own research; if I want to assure positive learning outcomes for all my students, I must carefully account for their language needs and make sure to create a community that values Spanish. Since content and language learning support each other, it will be important to design hands-on activities that allow students to talk about the science and environmental education concepts we are studying. To help me achieve these goals, I will use the thematic unit planning tool created by Hamayan et al. to modify my environmental education curriculum and create my content and language objectives.

The research on bilingual program challenges also impressed upon me the difficulty of making sure a program is equitable. Are all of my students feeling connected to what we are learning and pushed to construct their own understandings? Is my instruction giving them concrete experiences to talk about and learn from? It is my hope that this project can ensure that students who are learning a language are still getting access to rich content and the benefits of environmental education, which I will expand upon in the next section.

Environmental Education

The North American Association for Environmental Education defines environmental education (EE) as " a process that helps individuals, communities, and organizations learn more about the environment, develop skills and understanding about how to address global challenges" (2010). While fields such as conservation, nature study, and outdoor education had existed since the end of the nineteenth century, the term "environmental education" did not come into use until the 1960s (Palmer, 1998). EE is interdisciplinary but has particularly strong connections to the interrelated fields of science, technology, engineering and math (STEM) education. The National Science Teachers Association strongly supports including EE in school curricula and says that the environment is "an essential component of a comprehensive science education program" (2003). There are significant commonalities between best practices in EE and STEM education, so while I will approach this section through an environmental lens, it is with the understanding that effective EE also nurtures the development of scientific knowledge.

Environmental education has hatched many sub-categories of environmental pedagogy, and each has a unique perspective on how teachers should approach instruction about the natural world. Three overlapping fields—place-based EE, urban EE, and multicultural EE—each offer an important perspective on how to best teach students about the environment.

Place-based environmental education. Place-based learning attempts to make environmental education experiential and relevant. As Woodhouse explains, place-based pedagogies "explicitly root the learning experience in the location of the learner" (2001, p. 1). In place-based learning, a student's specific local environment and community become the focus of hands-on instruction across content areas. The aim is to teach academic content while also developing students' connection to and appreciation of the place where they live (Sobel, 2004). Instead of studying rainforests on another continent, for example, students might discover what plants and animals are living on their own school grounds. Place-based education need not be limited solely to nature; learning about local cultural resources and community engagement also fall under this label because they seek to deepen student understanding of the place where they live (Smith, 2002).

In addition to being developmentally appropriate, this type of pedagogy may lead students to engage in more positive environmental behavior. A meta-analysis by Zelezny (1999) of environmental education interventions showed that classroom activities where students actively participated were more likely to lead students to pro-environmental behaviors. Part of this change in behavior, according to Kudryavtsev, Stedman, and Krasny, can be accounted for by the development of a sense of place (2012). A sense of

place has two components: place attachment, which refers to a bond between people and places; and place meaning, which is the symbolic importance a place holds for people. Place attachment forms in a variety of ways, including the frequency and duration of time spent in a place, active involvement with a location, and social interactions connected to that place. Kudryavtsev et al. find two primary ways of developing place meaning: first-hand experiences in a place and learning about meanings through other sources, such as written materials, visual representations, and people. Place-based education can help create this sense of place by providing the experiences that lead to place attachment and place meaning, which will in turn foster pro-environmental behaviors.

While there are many approaches to place-based education, there are some common elements. G. Smith (2002) asserts that the program must first and foremost be grounded in local phenomena. In addition, it should have a constructivist approach, viewing students as creators of knowledge and following student questions and interests. Teachers, therefore, must become facilitators and co-learners and seek to better connect learning in school with the wider community.

Urban environmental education. The second perspective, which often overlaps with a place-based approach, is urban environmental education. This field applies many of the principles of place-based education in an urban environment. For many years, the environmental movement focused on preservation: maintaining and protecting wilderness areas without permanent human habitation. The rationale was often to defend the natural beauty of a remote location, but visiting that remote location was a privilege reserved for those who could afford the time and expense. This created a dichotomy between nature, conceived of as untouched wilderness, and development, settled areas viewed as solely

for people (Hazula-DeLay, 2001). In reality, humans have shaped the landscape for thousands of years, and nature exists, and even thrives, in the densest cities (Minnis & Eliesens, 2000). In light of these understandings, environmentalists have begun to focus more attention on the role that nature plays in suburban and urban settings.

Urban environmental education has a few distinct themes that set it apart from other forms of environmental education. Kudryavtsev and Krasny (2012) explain that urban EE starts with some basic assumptions about the significance of the urban environment: rather than being at odds with nature, cities are viewed as classrooms, integrated social and ecological systems, and even natural environments in their own right. From this perspective, environmental education in the city has the potential to foster environmental stewardship and promote community involvement.

Multicultural environmental education. In recent years, many environmental researchers have begun to focus on making the environmental movement more inclusive. Multicultural EE is another lens to consider in teaching students about the environment because it joins the study of the natural world with an awareness of the cultures of students and their community. According to Martin, it "recognizes cultural heterogeneity —differences in perspectives, histories, interactions, opportunities, neighbourhoods [sic] and priorities—when teaching about environmental issues" (2007, p. 16).

Multicultural EE also emphasizes environmental justice. For much of the history of the environmental movement, Martin explains, the issues focused on were those of wilderness areas, while problems that disproportionately affected low-income populations and people of color, such as industrial pollution or the lack of urban green spaces, were overlooked (2007). She views the multicultural EE lens as a necessary

corrective to neglect by traditional EE of the community context for the environment. Cole (2007) concurs with the need to focus on the community: as a teacher in rural New Mexico, she realized that her experiential, place-based approach to EE was not sufficient for her students because she had not taken the social and cultural aspects of the community into account.

For some, multicultural education is a natural partner to environmental education. Rather than viewing the former as a critique of the latter, Nordström finds a number of parallels between multicultural education and EE, although she acknowledges that EE has historically overlooked culture. The important themes that both approaches share include the value of diversity, a sense of belonging, respect and compassion, justice, societal reform, and a global perspective. She contends that the fields overlap to such a degree that they may not be separate aims after all (2008).

As with the other two perspectives on EE, multicultural EE is practiced in many different ways and many different settings. There are some commonalities, mostly in terms of the theoretical framework for instruction and the target audience, according to Marouli (2002). She conducted interviews with a variety of multicultural EE practitioners and found that programs tend to focus on cultural pluralism, environmental or social justice, or fostering global and local connections. She also observed that the great diversity of multicultural EE programs speaks to the importance of the local context; an effective program needs to respond to the community in which it resides, and therefore educators should adapt lessons to the culture and experiences of students.

Best practices in environmental education. Across all types of EE, certain pedagogical principles remain constant. An influential early model for environmental

education was Rachel Carson, better known as an eminent scientist and founder of the modern environmental movement. In addition to her famous work *Silent Spring*, Carson published *The Sense of Wonder* (1965), a volume of photographs from nature walks with her seven-year-old nephew, accompanied by an essay explaining her philosophy and practices. In it, Carson outlines the everyday observations and daily interactions with nature that she believes lead to a deep interest in and appreciation for the natural world. Instead of merely learning about his environment, through books or lessons, her young nephew is learning in and through it. This book has served as an early example of how to develop curiosity about the environment.

Many researchers have come to agree with Carson's experiential approach. Wilson (2008) emphasizes simple experiences, active involvement, and engaging the senses when teaching young children about nature. She also suggests that educators should foster that sense of wonder, which Carson found so crucial, by encouraging creative outdoor play. In their 2010 Guidelines for Excellence, the North American Association of Environmental Educators explains, "In these early years of formal education, learners tend to be concrete thinkers with a natural curiosity about the world around them. Environmental education can build on these characteristics by focusing on observation and exploration of the environment—beginning close to home" (p. 2). Sobel (1996) advocates a similar approach. For the youngest children, aged four to seven, he recommends fostering empathy with the natural world and its creatures. His reasoning is that by trying to teach young children about complex ecosystems or global problems, the content becomes too abstract too soon and can lead children to "ecophobia," which he defines as associating nature with fear and danger. Children should first learn about their

own environment and develop an appreciation for it, and then when they are older they will have the knowledge base and higher-level thinking skills to allow them to understand complex concepts like pollution and climate change.

An experiential approach is also supported by psychology research on the stages of development. According to Piaget, around age seven children are moving from a preoperational stage to concrete operational, in which they are more able to classify what they observe and understand transformations. Their thinking, however, is still grounded in the concrete, so understanding abstract concepts poses a struggle (Galotti, 2004). Therefore, children at this stage need hands-on activities to learn best and through a focus on the natural world, environmental education can provide these types of experiences.

Project WILD. One of the most well-established environmental education programs is Project WILD. The program was introduced in 1983 and by 2006 had trained over one million educators in how to implement the lessons in their classrooms (Carey & Harrison, 2007). Created jointly by the Western Regional Environmental Education Council and the Western Association of Fish and Wildlife Agencies, the curriculum provides interdisciplinary lessons for kindergarten through 12th grade to develop understanding of environmental concepts through a focus on wildlife. Rather than providing a single scope and sequence, Project WILD is a resource with a variety of lessons designed to be implemented in both traditional school settings and informal settings like nature centers, day camps or parks. The lessons are organized into three main sections: Ecological Knowledge, Social and Political Knowledge, and Sustaining Fish and Wildlife Populations, but can be used in any order. The lessons can also be

indexed by grade level, activity type, topic, and whether the setting is indoor or outdoor (Council for Environmental Education, 2000).

Project WILD has been updated many times and has also expanded its scope through additional curricula. The Aquatic WILD curriculum shifts the focus to aquatic habitats and Flying WILD offers lessons for middle schoolers about birds. Proyecto WILD is a Spanish-language version of select Project WILD and Aquatic WILD lessons. To support environmental education in early childhood programs, the Growing Up WILD curriculum provides lessons for children aged three to seven (Council for Environmental Education, n.d.). Project WILD has also made steps towards urban and multicultural EE by noting which lessons would be possible in an urban context and including an appendix on multicultural education.

Implications for my research. The field of environmental education has been enriched by research on place-based, urban, and multicultural education. While initially overwhelmed by the multitude of perspectives, I now tend to agree with Nordström (2008) that they in fact have great parallels, and through careful planning my own research will be able to incorporate multicultural pedagogy and place-based strategies in our urbanized school environment. Multicultural EE, in particular, requires responding to the local context of my school community, so as I adapt the Project WILD lessons I will pay close attention to how to engage the cultural diversity of my own classroom. With its emphasis on experiential learning, local places and personal connections, EE is also supporting developmentally-appropriate best practices. Students learning language and content together need concrete experiences to construct meaning, and EE is a natural avenue to provide these sorts of learning opportunities.

Bilingual Environmental Education

While the bulk of this chapter treats bilingual education and environmental education as separate fields, there are in fact many areas of common practice. Both environmental education and dual immersion support experiential learning as absolutely essential to effective instruction. Students need to feel, see, touch and experiment for themselves in order to make meaning with both language and content. By focusing on our local environment and validating the diversity of experiences among students, environmental education can help create an equitable learning environment in a dual immersion classroom and give students pride in being bilingual. A language becomes more valuable when it allows you to describe your home, your community and your life experiences: the things that matter. Unfortunately, I could find few examples of bilingual environmental education. While Project WILD has a version of its curriculum in Spanish, it contains a smaller selection of lessons, which are mostly geared to intermediate and secondary students. The lack of resources for providing environmental education in immersion programs shows why my capstone is necessary.

Conclusion

This chapter has outlined the research background for answering the question, *How can environmental education curricula be implemented in dual immersion classrooms?* Bilingual education includes a wide range of program models, but dual immersion is supported by many studies as the most effective. However, this type of program faces challenges including a lack of resources and the inevitable inequities between student groups based on native language and socioeconomic status. Environmental education also encompasses many different strands, but three of the most

relevant for the purposes of this study are: place-based education, a focus on understanding the ecosystem and community of a student's immediate environs; urban environmental education, which shifts the focus of study away from pure wilderness areas to the resources and organisms of a city environment; and multicultural education, which situates environmental issues in a cultural and historical context. Environmental education and bilingual education both emphasize experiential learning and provide complementary strategies for teaching language and content, but few examples of environmental education practices in dual immersion settings exist. In the next chapter, I will explain the methodology I used for my own action research to help fill this gap.

CHAPTER THREE

Methods

To answer the question, *How can environmental education curricula be implemented in dual immersion classrooms?* I explored research on both dual language instruction and environmental education in Chapter Two. In this chapter, I will outline the research methods I used in my own classroom to first adapt relevant lessons from Project WILD, a K-12 environmental education curriculum, according to a dual immersion unit planning tool, and then implement the lessons in my classroom to see how they affected my students' content knowledge, language abilities, and appreciation for the natural world.

Research Paradigm

As a current teacher, I am intensely concerned with improving my instructional practice to benefit my students. In order to learn about implementing environmental education in my dual immersion classroom, I needed to modify my chosen curriculum, Project WILD (Council for Environmental Education & Western Association of Fish and Wildlife Agencies, 2000). I then gathered data in my classroom about the effects of the curriculum on my students. This project, therefore, encompasses both curriculum design and action research elements.

To modify the curriculum I weighed the many factors involved in lesson planning for dual immersion. As outlined in more detail in Chapter Two, the teacher must consider the language demands of the content and create complementary language objectives. Planning must also equitably address the huge diversity within a dual immersion classroom, including race, culture, socioeconomic status, and language abilities. To support all these goals, I used a thematic unit planning tool created by Hamayan, Genesee, and Cloud (2013) specifically for dual immersion settings (See the blank unit plan in Appendix C). I also considered the theoretical framework provided by multicultural environmental education and strove to include the cultural context of our classroom community in our lessons. After these lessons were modified, I then examined their effects in my classroom.

Action research is an appropriate approach for this project, according to Mills (2011), because it allows an educator not only to learn about the effect of an instructional practice, but also to employ that knowledge immediately to effect a positive change in the classroom. For this project, I chose a qualitative approach to data collection, in order to gain insights into the effects of the curriculum in a variety of areas of learning, from content knowledge and Spanish academic language to attitudes about nature; as Mills describes it, qualitative research can help answer the question, "What is going on here?" (p. 74). To gather information I recorded my observations, collected samples of student work, and conducted individual interviews. All these sources of information allowed for triangulation, the use of multiple sources of data in order to address the same question, an important component of qualitative research (p. 92). The section on data collection and analysis details the sources of data that were used.

Adaptation of Curriculum

For this project, I created a unit plan and five lessons for my classroom. Four lessons were adapted from the Project WILD curriculum (Council for Environmental Education & Western Association of Fish and Wildlife Agencies, 2000): "Learning to Look, Learning to See" (p. 280), "Wildlife is Everywhere!" (p. 49), "Everybody Needs a Home" (p. 59), and "What's That, Habitat?" (p. 54). The selected lessons were age-appropriate and lent themselves easily to an urban education setting but also required modification in order to be more integrated into our local environment. These four lessons led up to a final lesson on creating an animal habitat, which I adapted from my school science curriculum. The unit plan I created, and the individual lessons, comprise Appendix D and Appendix E. After these lessons were modified, I was able to examine their implementation.

Implementation of Curriculum

To explore the effect of place-based environmental education on students in a dual immersion context, the series of Project WILD lessons I modified was conducted with my first grade class over the course of a week in April, culminating in a science activity that was already a part of our school's first grade curriculum: the creation of three-dimensional model habitats. These lessons took place during writing time in my general education first grade classroom, and the final habitat creation lesson took place in conjunction with this special science lesson.

Data Collection and Analysis

In keeping with a qualitative study, a variety of sources of information were collected. First, a detailed log was kept for the duration of the study to record how

students responded to each lesson, strengths and weaknesses of the lessons, areas where the delivery of the lesson diverged from the plan, and any other relevant observations. Secondly, each lesson elicited information on what students observed or experienced outside, recorded in co-created charts. Thirdly, student work, from written and drawn observations to individual animal habitat dioramas, was analyzed for the inclusion of relevant details, observations and vocabulary. Finally, individual interviews were conducted in Spanish with a representative subset of eight students about what they chose to include in the diorama, their reasons for inclusion, what other information they had learned about their chosen animal, and their feelings about the activities. I used a set list of questions for each student (Appendix A). The students in the sample presented a range of abilities, identities, language backgrounds, and ethnicities.

Each of these forms of qualitative data was analyzed to determine the impact of the modified lessons. I looked specifically for evidence of three possible areas of student growth: environmental content knowledge, use of relevant vocabulary and sentence structures in Spanish, and appreciation for the natural world.

Setting and Participants

This study took place at a pre-kindergarten to fifth grade elementary school in a large urban Midwestern school district. The neighborhood around the school is very diverse and predominantly low-income. The school has two program strands: within each grade, two classrooms are part of the dual immersion Spanish program and two are traditional English classrooms. Both programs have 100 minutes of science per week as well as supplemental science activities that vary by grade, as part of the school's "BioSmart" designation. The student body is racially and linguistically diverse, but

overwhelmingly low-income: in the 2014-2015 school year, 93% of children qualified for free and reduced lunch. In that same year, 70% of students were labeled "English Learners."

The study itself involved a class of twenty-three first grade students in the Spanish dual immersion program. The majority of the class spoke Spanish as their first language, but there were also native English speakers in the group; the division was about 65% Spanish-dominant to 35% English-dominant. In the program, classroom instruction in first grade is entirely in Spanish, but students who qualify receive small group English instruction from an English Learner (EL) teacher.

For the purposes of this study, information was gathered in two locations: the first grade classroom and the school grounds. Most of the direct instruction occurred in the classroom, but four of the five lessons also required observation outside. For these observations, the class walked to the closest door, where students typically enter and exit for the buses, and observed the sidewalk and green spaces just outside the school, rather than making a longer trek to the playground. This area contained a wide sidewalk with a few steps down from the school door to the street, lined by concrete planters with tall grasses and other perennial plants. Along the road were a few large boulevard trees and areas with mowed grass. Students were allowed to observe along this side of the building within sight of the teachers.

All students were given the opportunity to participate through the consent letter I sent home in February. Parents were informed, in English and Spanish, about the study and could choose to consent to having their child participate (Appendix B). Participant anonymity was preserved by using pseudonyms for all students involved.

Ethics

In order to protect the students participating in the study, I sent parental consent forms home with the entire class, in English and Spanish, explaining the research, the activities in which students would participate, and the rights of the parents to withdraw consent at any time (Appendix B). To maintain the confidentiality of the students who participated, pseudonyms were used throughout and no identifying information was included. In addition, I obtained approval for this research project from the school principal, the district office, and the Institutional Review Board of Hamline University.

Summary

In this chapter I explained the design for my research to address the question, *How can environmental education curricula be implemented in dual immersion classrooms?* This action research project had two major components: the modification of lessons from the Project WILD curriculum and the implementation of the lessons in a classroom. A variety of qualitative data was collected in order to ascertain how these lessons affected student learning and student attitudes. The setting was a diverse public school in an urban area and the participants were first grade students in a Spanish dual immersion classroom. The identities of the students were protected throughout the research process. In the next chapter, I will discuss my results.

CHAPTER FOUR

Results

In the previous chapter, I explained my methods for modifying a curriculum and gathering data to answer the question, *How can environmental education curricula be implemented in dual immersion classrooms?* To address this question, I examined three stages of the process of implementation. First, I modified lessons from the environmental education curriculum Project WILD to create a unit plan for my dual immersion first grade class. Second, I taught the lessons and monitored progress through personal reflections, co-created charts and daily student work. Finally, I examined student outcomes through a final diorama project and student interviews. In this chapter I will examine these three stages of implementing my environmental education curriculum and what I learned throughout the process.

Curriculum Planning

In order to implement environmental education in my class, I first needed to find an appropriate curriculum and make a concrete plan for the lessons I would teach. My school's science curriculum already had a one-day lesson on creating animal habitat dioramas so I looked for lessons that would lead up to this final project. Project WILD, a well-established environmental education curriculum, focused on wildlife and seemed like a natural fit (Council for Environmental Education & Western Association of Fish

and Wildlife Agencies, 2000). It offers lessons on ecology and wildlife intended for a wide variety of contexts, from kindergarten to high school, and from traditional classrooms to nature centers or outdoor camps (see Chapter Two for more information on the program). While the lessons did seem to be quite versatile, left unmodified they would not address the challenges of dual immersion. The lessons assumed a fairly high level of content knowledge and nature vocabulary and lacked structured opportunities for students to practice the language necessary to understand the content. Moreover, none of the lessons that fit our first grade standards around animal habitats were available in Proyecto WILD, the Spanish version of Project WILD (Council for Environmental Education & Western Association of Fish and Wildlife Agencies, 2007). Clearly, trying to teach the lessons directly from the curriculum would not work.

In order to follow best practices in immersion education, I modified the lessons with a unit planning tool created by Hamayan, Genesee and Cloud (2013). This structure ensured that my plan would take everything necessary into account, from content standards in science and language arts to the needs of emerging bilingual students. In addition, it was designed specifically to aid in planning thematic units such as this one. I found that this unit planning tool provided an excellent guide to fleshing out the content and language of the lessons. Appendix C contains a blank version of the unit planning tool with my modifications, and Appendix D contains my animal habitat unit plan.

One of the first tasks of the unit planning tool was to identify the relevant academic standards for my state, which for this unit were English language arts and science. While teachers are often required to post standards or refer to them in lesson plans, it is rare that I get to start my lesson planning from the standards themselves,

unencumbered by a curriculum or pacing guide. As I examined the standards, it became clear that learning about habitats and animal survival for science could easily provide the content for my students to write an informative/explanatory text for language arts. Rather than trying to cram two subjects into one, the thematic plan would allow my science and writing instruction to support each other.

After examining the standards, I chose four lessons from Project WILD that aligned with first grade and would build on each other to create a coherent unit (Council for Environmental Education & Western Association of Fish and Wildlife Agencies, 2000). The first lesson, "Learning to Look, Learning to See" (p. 280), provided an introduction to observing living things around our school. The second lesson, "Wildlife is Everywhere!" (p. 49), helped students identify the creatures outside our school. The third lesson, "Everybody Needs a Home" (p. 59), introduced the need of both people and animals for a habitat. The fourth lesson, "What's That, Habitat?" (p. 54) taught the five basic survival needs of people and animals. None of these lessons were available in the Spanish version, Proyecto WILD (Council for Environmental Education & Western Association of Fish and Wildlife Agencies, 2007). Nonetheless, I was able to pull some content-specific vocabulary from similar lessons, in hopes of ensuring that my lessons contained correct terminology.

One of the features of the unit planning tool was a section called "Major Teaching Activities," which was further divided into preview, focused learning, and extension phases. These were not categories I had encountered before, so at first I was unsure about how to approach them. As I read about what each category was, I realized it was similar to the structure of a basic lesson, with an introduction, direct instruction, and then

independent practice. I used these categories to help organize the activities from my Project WILD lessons into a logical flow. Since some of the Project WILD lessons lacked an outdoor component, I added observation activities that would support the overall objective. I then distributed the activities across four days of teaching. The culminating activity for day 5, creating habitat dioramas, was a part of my school's science curriculum rather than Project WILD, and was a perfect fit for the extension phase.

I encountered a few areas of the unit planning tool that required alteration. One of the most significant was how I chose to approach the language objectives. The unit planning tool suggested creating two types of language objectives: "content obligatory," which are the skills that are fundamental to the content area, and "content compatible," which are complementary to the content and will enhance students' language abilities (Cloud et al., 2000). In professional development at my school, however, we have been focusing on the language standards from the WIDA consortium, a prominent education organization focused on language learning. Within the WIDA standards, there are three ways of examining and understanding academic language, which WIDA refers to as 'dimensions': discourse, which is determined by linguistic complexity; sentence, which encompasses language forms and conventions; and word/phrase, which focuses on vocabulary (WIDA Consortium, 2012).

Breaking down the language by these three WIDA dimensions made more sense to me and brought a deeper analysis of what language was actually required to access the content. By analyzing the tasks through the three dimensions, I realized students needed background knowledge around the use of prepositions like "in," "under" and "next to," in order to describe where an animal lived or where they found evidence. Just focusing on a

list of vocabulary words would not allow students to explain where something was. To address this need, I added a lesson on prepositions for positions and locations to the section "background knowledge needed." The categories of simply "content obligatory" and "content compatible," as used by the unit planning tool, would not have fostered the same depth of insight.

While I was excited to see the unit take shape through the unit planning tool, I realized I still did not know precisely what I would be teaching each day. The plan provided a thorough overview and managed to encompass all the different sorts of learning that I hoped would take place, but when I imagined teaching the lessons I felt a little lost. In looking online for examples of units created with the unit planning tool, I found a Two-Way Immersion Toolkit created by Howard, Sugarman, Perdomo and Adger (2005). The section on model lessons included both overall unit plans and corresponding sample lesson plans. I decided to follow this example and create individual lesson plans, in Spanish, based on the unit plan. I then had a comprehensive animal habitat unit plan (Appendix D), incorporating experiential learning and intentional language instruction, as well as five days of lesson plans (Appendix E) for studying animal habitats.

Teaching the Lessons

When the lessons were fully planned, it was time to implement them and see how they fared in my own classroom. Within one section of the unit plan (Appendix D), "background knowledge needed," I did identify a few areas I needed to pre-teach. The week before these lessons began, I taught a brief lesson on Spanish prepositions and we played a game that required students to use prepositions to describe where something was

in the room. I also had short discussions about observing, the meaning of the term "ambiente" (environment), and the expectations for working outside, so students would be prepared to make the most of our lessons.

For the lesson plans (Appendix E), I intended for the first lesson to be an introduction to observation and animal habitats, not requiring a great deal of prior knowledge, while subsequent lessons would build up content knowledge from this foundation. Based on my research on environmental and immersion education, I believed the daily outdoor experiential activities I had planned would have the greatest influence on whether these lessons would be engaging and effective. What I hoped would be a strength, though, was also a challenge: the lessons had to be conducted when there would be both enough living outside that first graders could find things to observe, and when we would have successive days of nice-enough weather to allow for extended time outdoors. Through these lessons, my goal was for students to understand what the components of a habitat are and how they help an animal survive.

April 15th: Lesson 1. The first day's lesson, adapted from the Project WILD lesson "Learning to Look, Learning to See," began with the broadest focus, intended as an introduction to the outdoor observations we would be doing on the following days. This day also needed to establish the routine of a mini-lesson, observation outside and a concluding whole-group discussion. The beginning of the lesson went as planned, with an explanation of what observing was and a quick activity to show the importance of careful observation by attempting to remember what was on a bookshelf in the room. The class started to get antsy, so I explained that we would be observing in one spot and recording their observations by what sense they were using: seeing, hearing, feeling, and smelling.

When we got outside, I could see that many students were itching to run off and explore, but we had to review the expectations of where they could go and how they should treat the things they found.

Despite the discussion and practice inside, the first attempt at observing was a challenge for many students in the class. In my April 15th reflection, I wrote, "Slowing down to actually observe was tricky for a few kids." Many students were quick to put one item in each category and claim they were done. I went around and asked students what they saw; one boy answered, "Nada [Nothing]." While he was surrounded by plants, buildings, insects, and a variety of other things, he had trouble focusing on these everyday items. Nonetheless, after a little while it got easier for some students to focus on the details around them. I watched one girl crouch and then, still bent over, walk along the edge of the sidewalk, eyes on the ground. When I asked her what she saw, she poked the dirt gently with her finger and replied, "Hormigas. Y hay tierra [Ants. And there is dirt]". She was so consumed by her observations that she left the clipboard in the grass and just watched. I was heartened; finally, some students were discovering the interesting things under their feet. When the time came to return to the classroom and share what we had seen, I noticed many students actively using their observation sheet to decide what to share.

Looking at the student work for the day it was clear that careful observation was a challenge for many students. All students were able to put at least one or two objects for the sight category, and most of them found something for hearing as well. Touch and smell were more neglected, and many lacked vocabulary to describe how things smelled or felt. Grass and flowers were the most common smell answers by far. Three students

each put “miel [honey]” even though there was no honey nor anything else sweet-smelling. This answer seemed to come from their own expectations instead of observation, and showed that I would continue to have to prod students to investigate for themselves.

April 18th: Lesson 2. For this second lesson, adapted from the Project WILD lesson “Wildlife is Everywhere!” I hoped to help students hone their observation skills by searching for wildlife around our school. The challenge for this lesson was to help students understand that, even if we do not see certain animals, we can infer their presence from other evidence, such as a spider web. In contrast to the previous day, some students began observing as soon as we walked out the doors of the school: before I had finished giving directions a group had already spotted a wasp and the students clamored for their observation sheets. Rather than running off into the grass, as they had the previous day, many students sat down on the steps immediately to record their first observation.

The wasp sighting led to other interesting conversations as well. Some students, both Spanish and English speakers, called it “avispa [wasp]” while others used “abeja [bee]”. That fact that the native Spanish speakers were equally unsure of the correct term made me realize that it was not just a vocabulary issue, but also a lack of understanding of the difference between a wasp and a bee. Since the goal of that part of the lesson was to observe as much as possible, I chose not to distract students with a clarification at that moment but made a mental note to try to find time to compare bees and wasps.

Every student I saw began with the top part of the observing sheet, “Vida salvaje que yo vi [Wildlife I saw]” and many found bees and ants right away. Finding evidence

was much more challenging and students were reluctant to attempt that part of the worksheet. When one student came over to tattle in English, "She touched bird poop!" I reacted with interest and asked both students to show me what they had found—not the reaction the first student had expected. What they thought was a bird dropping was in fact just grout between bricks, but I helped the two find some actual droppings. As other students realized what we were doing, they joined in and soon students were rushing from all parts of the yard to show me "popó de pájaro [bird poop]. The careful searching required to find small bird droppings led to other discoveries, such as anthills and small insect holes in the trunks of trees. Some students just recorded the evidence, while others wrote or drew the evidence as well as what animal it might have been from.

When we returned inside for our discussion, I marveled at the number of raised hands and listening faces, not the norm for this somewhat immature and squirrelly class. As I explained in my April 18th reflection, "I had that feeling that I haven't had much this year: the feeling that everyone was not just listening, but engaged." Students quickly named wildlife they had seen, such as worms, flies, wasps, ants, and birds. A native English speaker added, "El araña [the spider]" using the incorrect article. I helped the students to notice the word endings of the animals and we went back through adding articles, using 'La' for animals ending with 'a' and 'El' for animals ending in 'o'. Students seemed to follow this digression into grammar because it was still relevant to what interested them: the animals they had just observed. One struggling reader pointed out that "pájaro [bird]" ended with the syllable 'ro' so it needed the masculine article 'El,' and I was thrilled that she was able to make that connection.

The discussion also enabled students to help each other to expand their vocabularies, rather than relying on me. As we discussed evidence of animals, students started describing what they saw: “palos mordidos [chewed sticks]” and “un árbol que tiene hoyos [a tree that has holes]”. Rather than using just one or two words, explaining evidence required more complex phrases and sentences, and students strove to describe what they observed. One student shared that she saw “Un bug” but did not have a word in Spanish to identify what she saw. Others quickly stepped in to help, and “Un insecto [An insect]” was added to the chart. The discussion could have gone on much longer, but I felt confident that the class would bring this same enthusiasm to the next day’s lesson.

April 19th: Lesson 3. Before this lesson even began, I already felt uncertain; unlike the previous two sunny days, this morning began with rain and a gray sky that seemed to promise a wet day to come. I started the lesson knowing that we might have to postpone the most important part, the outdoor observation, for a later time. This lesson, adapted from the Project WILD lesson “Everybody Needs a Home,” focused on what people and animals need in their habitats to survive.

The beginning of the lesson felt like a great deal of teacher talk on my part, as I explained the meaning of “un ser vivo [a living thing],” “sobrevivir [survive]” and “hábitat [habitat].” When we began brainstorming what people needed to live, the class identified food and water right away, and then was unsure of what else to add. With prompting, we got to a house. One student mentioned “trabajos, y dinero [jobs, and money]” which lead others to more suggestions that pertained exclusively to people.

After we generated a list, I explained to students that they were going to go draw their own habitat and try to include the things on the list that they needed to survive. This

task was much harder for them than I had anticipated. Many students did not know where to start in drawing their own home, or got so bogged down in recording each room in their house that they made little progress.

This challenge was compounded by the fact that the rain had finally let up. Not wanting to miss our chance, I had the class take a break from their own habitat pictures and we shared a few of the needs that students had included in the pictures. We then returned to the list we had generated the previous day of wildlife around the school, and reviewed five animals whose habitats we would observe: ants, birds, spiders, bees and squirrels. I chose these five because I knew we could find evidence of them and the students had at least some background knowledge of these animals. The animal each student selected would be their focus for the remaining lessons.

Because of the rain, we could not sit on the steps to give directions as we had previously. I pointed out specific locations to observe each animal's habitat: a tree for the squirrels, another for the birds, a flowerbed for the bees, the sidewalk for the ants, and along the wall of the school for spiders. The rain also made finding a spider web a bit more challenging for the two students who had chosen that animal, but eventually we discovered a web in a dry niche along the wall, and it even contained some long-dead insects stuck in the silk.

Most of the groups were able to get to work drawing right away. Nearly all the drawings showed the animal's shelter, and many showed food, water, or both. A few students chose to add labels to their drawings, unprompted, such as "nido [nest]," "agua [water]," "huevos [eggs]," and "lombrices [worms]". One student, a native English speaker, tried to incorporate vocabulary that we had previously studied in a book about

bees: “abeja [bee],” “colmena [hive],” and “néctar [nectar]”. Four students drew rain streaming from the sky in their pictures; they were beginning to focus more on observing the cloudy day that was actually there instead of the stereotypical cute sun in kid drawings.

When we returned inside for our discussion, the students bubbled with ideas. I noted in my April 19th reflection that many students wanted to share stories of animals, alive and dead, that they had seen: “We heard about fallen nests, nests that had birds last year and now didn’t, baby chicks that died.” I was surprised that the comments were more focused on memories rather than the day’s lesson, but I think the experience of being outside helped them activate all their prior knowledge in a way that just talking about animals in the classroom would not. For my April 19th reflection I wrote, “It felt like the floodgate of personal experiences broke and that, even if we didn’t get to see any birds up close, the students had a lot of prior knowledge that they were starting to connect to our investigations.”

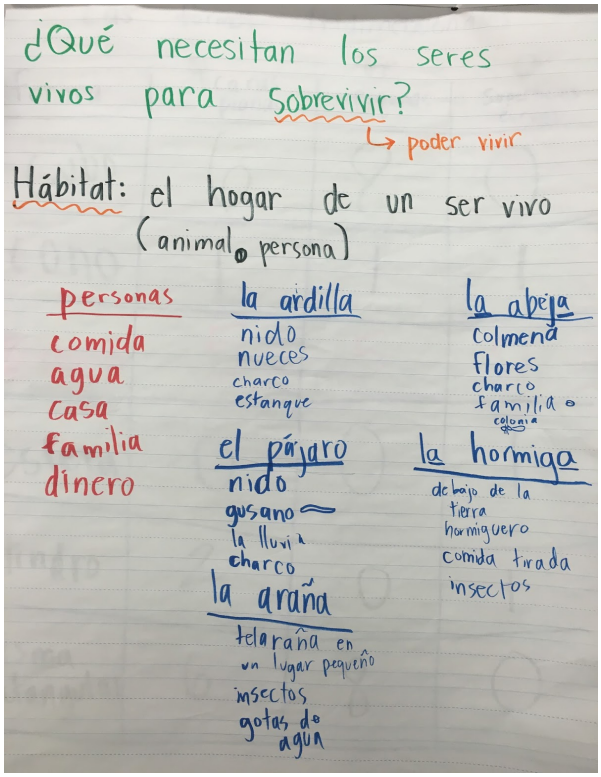

Figure 1: Student Observation Chart, Lesson 3

As we charted what we knew about each animal’s survival needs for their habitat (see Figure 1), more vocabulary started being discussed:

words like “telaraña [spider web],” “charco [puddle],” and “estanque [pond]” had not come up outside, but now that we were trying to record our observations in a calmer environment, I was able to prompt students to recall these more advanced words. The discussion propelled the class’s understanding of habitats forward.

April 20th: Lesson 4. For the final lesson, adapted from the Project WILD lesson “What’s That, Habitat?” students would be able to identify the five essential survival needs—food, water, shelter and space, as well as an appropriate arrangement of these four necessities. In addition, students would become familiar with how their chosen animal meets those needs. This was the last observing lesson before our culminating lesson on creating an animal habitat diorama.

My mini-lesson on the five habitat components went fairly quickly. We reviewed our observations from the previous day and then I gave a brief overview using the chart I had created, explaining the five components of a habitat. While some of the needs are fairly concrete, both space and the concept of an appropriate arrangement are a bit harder to understand, so I wanted to be sure the chart could be as supportive as possible. In addition, I used higher-level vocabulary words for food (“alimento”) and shelter (“resguardo”). For each item, I included visual examples and a few small labels from the

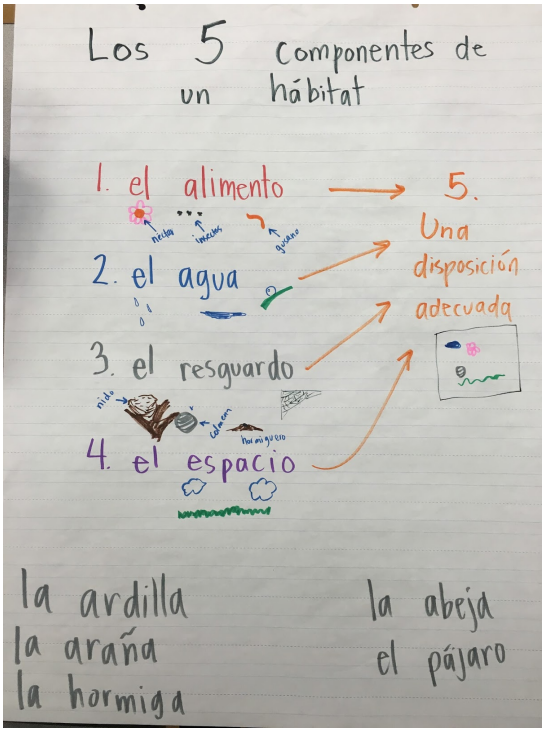

Figure 2: Habitat Components Chart, Lesson 4

animals we had studied, and then for the concept of appropriate arrangement, I drew a small habitat that included each necessity in relative proximity. We reviewed the five animals we were focusing on and I presented a quick explanation of how to use the observing sheet to record what the animal uses to meet each need.

After three days of observing, the students knew precisely what to do when they went outside, so I had no need to stop them for instructions. Each group went straight to where they had observed the day before and started recording. A few students got stuck when they could not immediately find one of the habitat components for their animal. The squirrel group wandered around under the tree, trying to find the squirrel's food source, until one student came running over to me with something she discovered: "Yo encontré una nuez, la ardilla comió la parte de adentro [I found a nut, the squirrel ate the part inside]". Students used a combination of drawings and words to describe how their animal gets what it needs, and many students starting using the vocabulary we had discussed the day before.

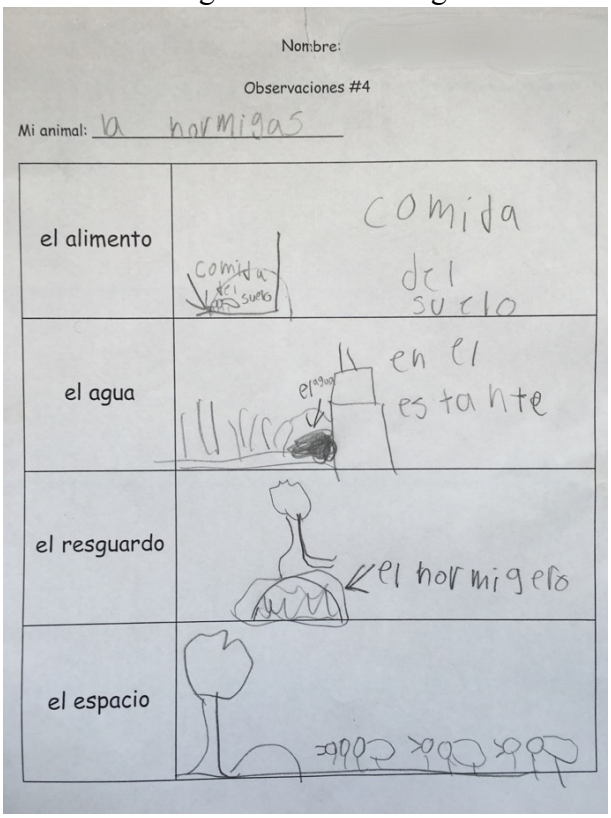

Figure 3: Student Observation Sheet, Lesson 4

Interestingly, three students did not even make it outside: the group that chose ants huddled in the entryway of the school, staring intently at the floor with my

colleague, an English language teacher. There were ants in the entryway, feasting on the accumulated crumbs, but no one in the group appeared to be writing. Once the other groups got started, I went to check on this group and found them embroiled in a serious discussion. As I leaned in, I realized what they were concerned about: these ants were directly in the path to the buses. In a few hours, the entire school would be leaving through these doors and the ants were in danger of being trampled. With the help of the English language teacher, the students picked up the ants one by one on their papers and deposited them near some plants outside. I could not have been more proud of the care they showed; this was the sort of concern for the natural world that I had hoped this project might foster.

Many students began noticing more details than they had on previous days, even when it might not be directly related to the task at hand. A few children called me over to see a circle of ants feasting on a half-eaten lollipop. Another girl came running over, shouting excitedly, "¡Un insecto extraño! [A strange insect!]" Others had new questions and wonderings about what they were seeing, like "¿Qué comen las moscas? [What do flies eat?]" Despite having already spent four days observing in the same place, the class was discovering more than they ever did during the first lesson.

After all these in-depth observations outside, our discussion was a bit anticlimactic. Since the class was so engaged, I had allowed them to stay out longer than previous days, but the hot sun tired them out, so I kept the discussion fairly brief. I knew the following day would give us additional time to review our observations before we began the final diorama project.

April 22nd: Day 5. For this final day, the students at long last got to complete our special science project on animal habitat, which I will discuss in more depth in the following section on outcomes. This activity had been a part of our school science program, termed "BioSmart," for a few years and was intended as a supplement to our regular science instruction. I hoped that the preceding four days of lessons would prepare the class to create realistic depictions of the five animal habitats we focused on.

After nearly a week of discussion, observation, and anticipation, the class was excited to finally begin the project. I showed an example diorama that I had created and we reviewed the components of a habitat that their animals would need to survive. We had the understanding that the box itself was the space the animal would need, but the other component (food, water, shelter, appropriately arranged) would have to be created by the students. The class quickly got to work and it was easy to circulate and provide help, since everyone was engaged. As in many first grade classes, there was a group of students who typically rushed through work so they could say, "I'm done!" but that was not happening during this project. In fact, two students in their interviews later mentioned specific additions to their dioramas that they did not have time for.

Outcomes

In order to gain a deeper understanding of the effects of this action research project, I focused on the work of eight students, five girls and three boys, through an analysis of their dioramas and individual interviews. Of the twelve students who returned a signed consent form, one was absent the day we made the dioramas, leaving me with eleven students to pick from for interviews. I tried to create as representative a sample as possible of the class, factoring in race, gender, native language, and academic

achievement. The group was composed of five native Spanish speakers and three native English speakers, which roughly mirrored the breakdown within the class. There were five Latino students, one white student, one African-American student, and one student who identifies as biracial white and African-American. This group also included three students reading far below grade level, four who were at grade level, or very near to it, and one who was above grade level. I will primarily draw conclusions from multiple students, but individual students will be discussed using pseudonyms.

Dioramas. Within the group of eight dioramas I analyzed, four did squirrels, two did birds, and one student each did ants and bees. This is roughly representative of the choices that were popular in the class as a whole; most kids chose squirrels or birds, with only a few students choosing the invertebrates.

While each student approached the project in a unique way, certain trends appeared across the projects. All eight of the dioramas contained shelter and at least one food source for their animal. Some students added a variety of food sources, and one even wrote labels on the various foods. Seven of the eight dioramas included water, as well; some students made ponds or puddles, while two others put small droplets of water on leaves for smaller animals.

Something I noticed in this group of dioramas, which I had not seen in previous years, was a higher level of detail. Many students spent time making a background, adding a sun, sky, and clouds. Few students in the class were trying to rush through the task or be the first once done, a common first grade goal. This project represented the culmination of learning that the students cared deeply about, which was reflected in their dedication.

In addition to their careful aesthetic choices, students included many small features that could be overlooked by the casual observer. In the example in Figure 4, Yolanda, a native Spanish speaker, took great pains in creating her habitat. In addition to drawing apples in the tree, she cut out a tiny circle and painstakingly glued it near the pond. It was only through talking to her about what she put in the diorama that it became clear what it was: a nut. This tiny circle was not included to look appealing, but because Yolanda wanted to demonstrate her knowledge of what a squirrel needed to survive.

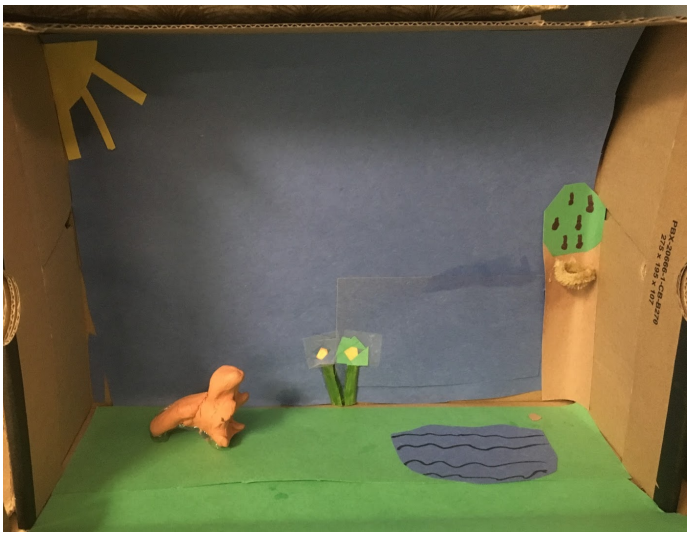

Figure 4: Yolanda's Diorama

Every student I interviewed who chose bees or birds created a nest for their animal in a tree. A few of them, like Felipe in Figure 5, made an individual tree branch for the nest, copying the nests we had observed outside. Felipe, another native Spanish speaker, made sure to include multiple food sources and even labeled the foods on the

Figure 5: Felipe's Diorama

ground: “nues [nuez, or nut],” “mora [raspberry]” and “mansana [manzana, or apple].” The blue paper next to the tree was a puddle to provide drinking water for the squirrel.

Jessica, a native English speaker, made a diorama for a bee and set up a unique challenge for herself: she really wanted the bee in her diorama to be flying. On her own, she came up with a solution: she made a thin line for the bee out of another piece of construction paper, and then with my help she gently taped on the clay bee once it was dry. She included many other details, like small puddles of water in the grass and multiple flowers and plants.

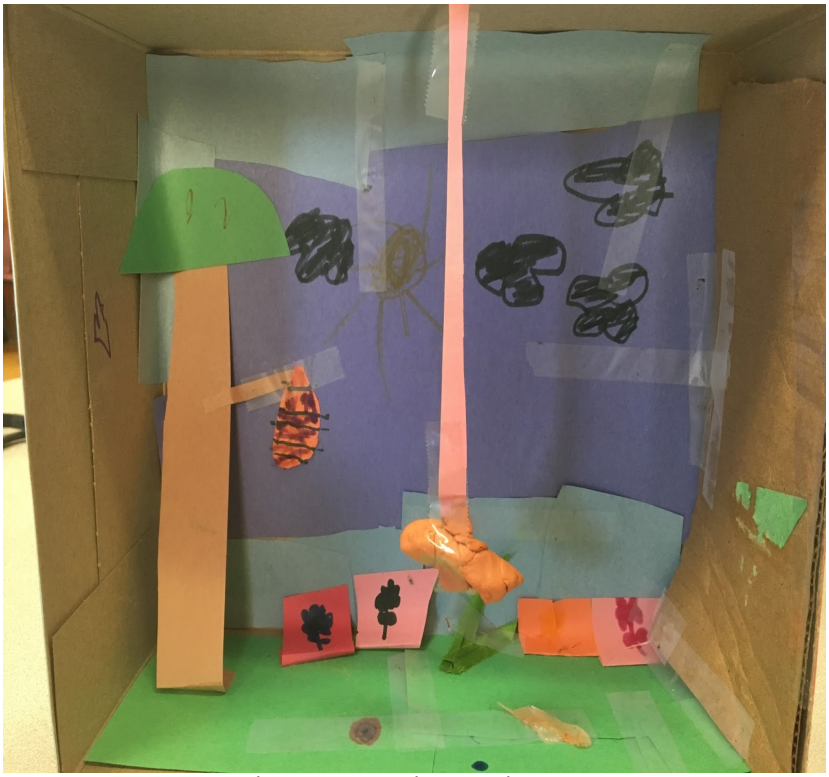

Figure 6: Jessica’s Diorama

Overall, I was thrilled with the results of this project. By including the essential components of their animal’s habitat each student managed to demonstrate what they had learned in their own way and with their own creative flourishes. The “sense of wonder” that Carson had described in 1965 was quite evident in their careful approach to the project. When I compared these dioramas to my recollections from previous years, where students lacked background knowledge of the animals they chose, it was clear that the concrete experiences and sensory activities

recommended by Wilson (2008) for environmental education had had an effect. The week of lessons helped change this project from merely a craft to a representation of students' science and environmental learning.

Interviews. Once the dioramas were complete, I conducted individual interviews with students during my prep time. For each interview, we had their diorama sitting in front of us so the student could explain their choices and draw ideas from their own work. I used the list of questions in Appendix A to get a deeper sense of what the students had taken away from this week of lessons, with a specific focus on content knowledge, language development and concern for the natural world.

Through these interviews, I hoped to find out what students now understood about animal survival and habitats. The first few interview questions focused on their dioramas, why they chose their animal and what their animal needed to survive. Every student identified food and water as essential to their animal's survival; five students named three needs, and two students even identified four total needs. The concept of an appropriate arrangement seems to be the hardest for students to understand; only one student explained this need. In the course of answering the question, "What does your animal need to live?" he explained, "Comida y agua, y no tan lejos porque si no, va a tardar y se va a cansar y tal vez se puede morir [Food and water, and not so far away because if not, it will be late and it's going to get tired and maybe it could die]". Despite teaching new vocabulary words for food and shelter ("alimento" and "resguardo") most students used the more common "comida" and "casa" to describe those needs. Interestingly, the only student who used the new vocabulary was an English speaker; I wonder if this was due to her greater reliance on text supports in the classroom, rather than prior knowledge.

Students also demonstrated knowledge of their chosen animals. When asked what they learned about their animal when we went outside, most of the students described what their animal ate or where it lived. Six of the interviewees had chosen birds or squirrels, which we did not get to observe directly for very long, so it was logical that they knew more about the parts of the habitat that we studied closely. One student said she learned that squirrels ate nuts and insects, and she explained that she knew this because she had seen a squirrel eating an insect. Another answered, "Que hacen sus nidos en la rama [That they make their nests on the branch]." The student who observed ants commented on their behavior: "Hay muchos… Estaba caminando [There are lots… They were walking]." The most salient facts the students learned were from their direct observations.

A few students had begun to form their own theories about animals, based on what they had witnessed. One student explained that he thought he could tell the difference between a squirrel nest and a bird nest by where it was in the tree: according to him, the squirrel nest would be lower and the bird nest would be higher, and that this idea came from the nests he had seen. Another student said she had seen birds at her house that ate nectar and pollen. As she recalled our time outside, a third guessed, "Encontré un charco y creo que allí toma, no sé [I found a puddle and I think it drinks there, I don't know]." While not all of their theories were correct, the students were using their observations to construct their own understandings of what animals did.

In the area of language, student responses varied enormously. I had one student who carefully restated each question to form the beginning of her answer, and another whose longest sentence in Spanish was four words. Most students fell somewhere in the

middle. These differences point to the wide variety of language skills in my classroom, not only due to differences between native speakers and students learning Spanish, but also confidence, speech and language disabilities, and first-language abilities. Among the three English-speaking students I interviewed, two already had large vocabularies in English, which seems to have supported their Spanish language acquisition. The Spanish-speakers also varied enormously in the language they produced, from a student who could fluently create complex sentences using the subjunctive, to another who constantly used the wrong article ("el" instead of "la", or vice versa). While I knew generally that I had a wide range of abilities within my classroom, the differing needs of English and non-English speakers in my class, as explained by Hamayan et al. (2013), became much clearer upon comparing these responses, and provided a detailed level of feedback to guide my instruction that I might not have been able to obtain with a more standardized assessment.

One of the language learning objectives for the unit was for students to be able to explain their thinking by using the conjunction "porque," or "because." Seven of the eight interviews contained at least one usage of "porque" and most students used it multiple times. One student used "porque" to explain the evidence he had observed for every animal he knew was living around the school. I noticed that many students did not use the conjunction within a complete idea, but rather to start their answer, such as "Porque a mí me gustan los pájaros [Because I like birds]." Both Spanish and English speakers had trouble using "porque" correctly. One student layered on idea after idea with "porque," sometimes inappropriately: "Porque mi papá dijo que me iba a comprar una ardilla, porque para mi cumpleaños, porque era mi deseo [Because my dad said he

was going to buy me a squirrel, because for my birthday, because it was my wish].” While many students understood the importance of explaining why they thought something, clearly they needed more practice using “porque” correctly.

An area where I saw a marked difference in language use between the English and Spanish speakers was the use of prepositions. In preparation for this week, I had done a lesson on using prepositions to describe where an object was. The native Spanish speakers used many of the prepositions we had practiced; most of them used three or more different prepositions to describe where they saw or put something. Among the English speakers, the only positional preposition used was “en [in/on]” and one of the students did not even use that. One student avoided needing to find the correct preposition by using very general words to describe her diorama: at one point she explained, “El espacio está allá como… allá. Y también hay flores para comer [The space is there like… there. And also there are flowers to eat].” She tried to find another way to explain where the animal’s space was, but when the words did not come to her right away she stuck with terms like “over there” and “there are.” I was fascinated to see the ways in which all of these language learners, at various stages of ability, found ways to express their understandings.

One of the strongest themes that stood out across these interviews was the students’ deep passion for what we had been learning during the week. When they were recalling their observations or how they created their habitats, the students had lots to say and were excited to share it. Perhaps unsurprisingly, every single student said they liked going outside to observe during the week, but the reasons why they liked it fell into two main camps. Four of the students had answers that related to a general interest in animals.

The other four mentioned something specific about observing or investigating. One student still had things he wanted to investigate outside, even after four days: “Porque yo quería encontrar más comida de ellos [because I wanted to find more of their food].” Another explained her reason why she liked the lessons as “porque habían nidos y después quería copiarlo para mi árbol [because there were nests and after I wanted to copy it for my tree].” She enjoyed using her observations to inform the work she was doing in the classroom, exactly what I had hoped this project might provide.

The very last question was one of the most open-ended, and led to some of the most fascinating responses. In Spanish, I asked, “What do you want the other kids at our school to know about the animals and plants that live here?” A few said they wanted others to know that the animals and plants were good and not to hurt them, even the ones that might bite or sting. Some students had developed an understanding of nature as worthy of protection for its own sake, not just for human benefit. Others should not destroy plants around the school because, one student argued, the bees need them: “Porque unas flores son para ellas [Because some flowers are for them].” One student drew a sharp distinction between her mother’s approach to insects and her own: “Si [yo] vería, como, una araña yo no la mataría, pero mi mamá no tiene otra decisión entonces la mataría [If I would see, like, a spider, I would not kill it, but my mom doesn’t have another decision so she would kill it].” My students were developing empathy with the creatures of the natural world and according to Sobel (1996), this compassion could form the basis for future environmental stewardship.

Another student even had a complex message specifically for me and to express it he stretched his language abilities mightily: “Yo quiero que ellos haga la misma cosa que

hicieron esta clase para toda nuestra escuela puede mirar [I want them to do the same thing that this class did so our whole school can see].” This student clearly saw the benefit of our outdoor observations. While I cannot take the entire school outside to observe with me, I do hope to expand the reach of this activity beyond just this year’s class.

Summary

In this chapter I detailed the steps I took to answer the question, *How can environmental education curricula be implemented in dual immersion classrooms?* I began by adapting Project WILD lessons on animal habitats using a unit planning tool created for dual immersion programs. I then implemented these lessons and witnessed how students grew more comfortable with observing and more interested in habitats as the lessons progressed. Finally, I examined student learning outcomes through their final projects and individual interviews. In Chapter Five, I will explore the major conclusions I have drawn from this project.

CHAPTER FIVE

Conclusions

Chapter Four detailed how I modified lessons from the Project WILD environmental education curriculum for my dual immersion classroom, conducted the lessons with my class, and analyzed the outcomes through student work and interviews. I hoped that a careful examination of this process would help me answer the question, *How can environmental education curricula be implemented in dual immersion classrooms?* In this final chapter, I will reflection on my major findings, relate my work to the literature I reviewed in Chapter Two, examine some limitations of this project, and look ahead to where this question might lead.

Findings

Through this project, I hoped to learn how environmental education curricula could be implemented in my dual immersion classroom. Yet each time I wrote my research question, in the back of my mind a shortened version kept niggling at me: Can this work? Is it possible to adapt a curriculum like Project WILD so it can meet the needs of an immersion program? To this most basic question, the answer was a resounding yes. The lessons from Project WILD did need some revision, but even with the added burden of translation it was mostly a question of choosing the right lessons and fleshing out the language supports required. It was a huge help that environmental education curricula

like Project WILD have such a wide variety of lessons. There are no requirements about the order of the lessons, so I was able to choose lessons that fit into what students were already learning. Many environmental education curricula may not have been designed with immersion in mind, but they can indeed be used in immersion classrooms.

With this basic question answered, the issue of how to implement environmental education in dual immersion presented itself. As I explained in Chapter Four, I used an immersion unit planning framework to help modify the curriculum. The format from Hamayan, Genesee and Cloud (2013) had a few sections that I tweaked, but in general it was thorough, easy to use and most importantly, ensured that I did not overlook a crucial component in planning for both language and content instruction. In adapting lessons from an environmental education curriculum, I have been able to delve deeper into the process of preparing for the varied language needs within an immersion classroom. With this level of planning, implementing environmental education lessons in my classroom became much less daunting.

The lessons I implemented on observing the animal habitats around our school had a positive impact on student engagement and content knowledge. My class was so excited to examine our environment and explain their findings. This extra time outside did not turn into recess; students quickly understood why we were outside and what their job was, falling into a routine of observing, questioning, recording and sharing. Students who had often been disengaged during lessons were suddenly raising their hands, eager to participate. When scientific vocabulary like “habitat” and “beehive” came up, students pushed themselves to use the terms because the words helped them explain their observations.

This capstone also demonstrated how effective these environmental education lessons were at expanding students' language. The observations lent themselves so naturally to conversation and pushed students to communicate more complex ideas. As I planned the lessons, I had hoped my class would learn the language and content together, but I underestimated how motivating these experiences outside would be in drawing out language. All the language planning I did in preparation for the lessons helped make them successful, but the biggest factor was having something meaningful and fascinating to talk about. The discussions we had after observing outside were some of the most engaging and academically challenging that we had had all year, and when students had the chance to share what they had learned through dioramas and interviews, they astonished me with their thoughtfulness and excitement.

Connections to the Literature Review

In my literature review, I was struck by the importance of experiential learning for both dual immersion and environmental education. The guidelines from the North American Association of Environmental Educators (2010) emphasize concrete experiences through observation and exploration of the local environment. Immersion experts Hamayan et al. (2013) advocate for using hands-on activities to support language learning. By observing, exploring, experiencing, and describing the environment around our school, my students gained knowledge of environmental concepts as well as more challenging language structures, which I believe will stick with them through the rest of first grade and beyond. The benefits of experiential learning cut across disciplines.

This project also demonstrated firsthand the impact of a developmentally appropriate approach to environmental education. In *Beyond Ecophobia* (1996), Sobel

refocused early environmental education on observing and experiencing the natural world close to home, rather than teaching about pollution, endangered animals or other environmental problems. Rather, care for the environment would flow out of the curiosity and knowledge that these early intimate experiences could provide. This was certainly the case with my class. By simply observing the animals around our building, students became aware of them and sought to protect them. I was so amazed by the group of students on the last day of observing that spent their time carefully bringing ants from the entryway to a flowerbed outside, out of harm's way. This awareness did not end when I finished the lessons, either: weeks later, students were still noticing new insects on the playground and running over to get my help in rescuing a worm. Students continued to show care for and curiosity about the environment when it was personal and immediate.

Limitations

As an action research project, this capstone was a snapshot in time: five days of lessons in one classroom. The effect of these lessons on my twenty-three students cannot necessarily be generalized to other classrooms in other communities. Every class of students is different, but this year's group was particularly young and had a number of students with significant challenges. Because of this, there were times when I could not follow the lesson exactly as planned or had to cut certain activities because of what the class needed.

The small set of participants in my capstone was another limitation. While all students were part of the lessons, and I could draw general conclusions from how the class responded, I only had twelve students return a permission slip to participate in the interviews, and since one was absent for the final lesson my pool of possible interviewees

shrank to eleven. While I tried to select as representative a group as possible, I cannot help but wonder if my sample was already somewhat skewed: are the families who chose to consent to this research more involved or more educated than those who did not? And would this family difference affect the way students responded to these lessons? With a small sample size, it is hard to know, but I do not assume that the experiences of my small group can be generalized to other schools, other places, or other programs.

Further Study and Implications

After seeing the success of the lessons I created this year, I am eager to explore more ways to let the outdoors into our classroom. I plan to reuse and improve on the lessons I created for this project. My first grade colleagues commented that my class's dioramas were much more detailed and carefully crafted than those made by their own classes, which I attribute to the days of study leading up to the project. After seeing the success of the lessons, the whole first grade team may choose to implement this approach next year.

Earlier this spring, two schools with dual immersion programs, my school and one other, began collaborating on interdisciplinary areas of study, integrating social studies and science into literacy instruction. When I was asked if I wanted to participate in creating these units, I jumped at the chance. My experience with unit planning for this project helped me in designing six units for first grade with science or social studies objectives, literacy objectives, and language goals. For a unit on animal survival, I was able to draw on much of the planning I did for this capstone. What began as a short project for my action research will now benefit students in dual immersion at two

schools. I am excited to try these lessons out in my own classroom this fall, and see how a more sustained implementation of thematic learning may affect my students.

While my own teaching will greatly profit from this project, there are a few other audiences that could benefit as well. As a dual immersion educator, I know there are not enough resources available to support my work. Both my curriculum and my findings could be very relevant to immersion educators across the country, or even around the world. Through an article in a publication like Science & Children or a post on a site like latinooutdoors.org, my project could find a wider audience.

This research could also help advocate for greater support of experiential or content-based instructional strategies. Based on my students' experience, the benefits of integrating environmental education into immersion instruction, and elementary instruction more generally, are overwhelming. At all levels, from individual districts to state and national departments of education, renewed attention should be brought to creating policies that support experiential, hands-on learning.

Doing this project has showed me the profound educational value of an environmental education approach. I believe that learning about the natural world around us is essential to all classrooms because it is not merely an area of study, but rather something fundamental to a child's development into a learner, community member, and citizen. Children will be able to better understand their own life experiences when they can describe the world in which they live. Students in dual immersion programs need an environmental education approach as much as, or perhaps even more than, students in traditional programs, because it will allow them to use the language they are learning to

understand their world, making both the words and the content meaningful. I hope to continue making these experiences possible for students in my classroom and beyond.

Summary

The motivation behind this capstone has been finding an answer to the question, *How can environmental education curricula be implemented in dual immersion classrooms?* In this concluding chapter, I explained my findings that environmental education curricula often need some modification to fit immersion needs, but using a unit planning framework designed for dual immersion can make the modification relatively straightforward. The environmental education lessons I did with my class had a positive impact on engagement, content knowledge, and language development. The effect of these lessons reflects the importance of experiential learning and developmentally appropriate methods of environmental education, as described in my literature review in Chapter Two. As an action research project, my conclusions are limited by the necessary modifications that come up in teaching new lessons in a challenging classroom as well as the small sample size. Despite these limitations, I plan to continue using these lessons and expand their influence through thematic unit planning for my dual immersion program. I am convinced that environmental education can be particularly effective in improving learning outcomes for students in dual immersion programs.

BIBLIOGRAPHY

Adelman Reyes, S. (2007). Beetles and butterflies: Language and learning in a dual language classroom. *Journal of Latinos & Education, 6*(1), 81-92. doi: 10.1207/s1532771xjle0601_6

Amrein, A., Peña, R. (2000). Asymmetry in dual language practice. *Education Policy Analysis Archives, 8.* Retrieved from http://epaa.asu.edu/ojs/article/view/399

Anderson, V., & Roit, M. (1996). Linking reading comprehension instruction to language development for language-minority students. *The Elementary School Journal, 96*(3, Special Issue: The Language-Minority Student in Transition), 295-309. Retrieved from http://www.jstor.org/stable/1001759

Arreguín-Anderson, M. G., & Garza, E. V. (2014). Bilingual pairs in teacher education: Exploring WILD strategies in an environmental education workshop. *Action in Teacher Education (Association of Teacher Educators), 36*(2), 171-184. doi:10.1080/01626620.2014.898599

Arreguín-Anderson, M. G., & Kennedy, K. D. (2013). Deliberate language planning in environmental education: A CRT/LatCrit perspective. *Journal of Environmental Education, 44*(1), 1-15. doi:10.1080/00958964.2012.665098

Boyd, M. P., & Galda, L. (2011). *Real talk in elementary classrooms: Effective oral language practice*. New York: Guilford Press.

Buxton, C. A., & Provenzo, E. F. (2012). *Place-based science teaching and learning: 40 activities for K-8 classrooms*. Thousand Oaks, CA: SAGE.

Carey, L., & Harrison, A. (2007). Project WILD: One million educators trained and growing. *New York State Conservationist, 61*(6), 24.

Carlisle, P. (2012). The larger view. *Science & Children, 49*(9), 50-54. Retrieved from Education Full Text

Caro, V., & Ewert, A. W. (1995). The influence of acculturation on environmental concerns: An exploratory study. *Journal of Environmental Education, 26*, 13-21. doi:10.1080/00958964.1995.9941441

Carrasquillo, A., & Rodríguez, V. (2002). *Language minority students in the mainstream classroom* (2nd ed.). Clevedon, England: Multilingual Matters.

Carreira, M. (2000). Validating and promoting Spanish in the United States: Lessons from linguistic science. *Bilingual Research Journal, 24*(4), 423-442. doi:10.1080/15235882.2000.10162776

Carrera-Carrillo, L., & Smith, A. R. (2006). *7 steps to success in dual language immersion.* Portsmouth, NH: Heinemann.

Carson, R., & Pratt, C. (1965). *The sense of wonder*. New York: Harper & Row.

Center for Advanced Research on Language Acquisition. (2014). Content-based second language instruction: What is it? Retrieved from http://carla.umn.edu/cobaltt/CBI.html

Cloud, N., Genesee, F., & Hamayan, E. V. (2000). *Dual language instruction: A handbook for enriched education*. Boston, MA: Heinle & Heinle.

Cole, A. (2007). Expanding the field: Revisiting environmental education principles through multidisciplinary frameworks. *The Journal of Environmental Education, 38*(2), 35-45. doi:10.3200/JOEE.38.1.35-46

Cormell, J., & Ivey, T. (2012). Nature journaling: Enhancing students' connections to the environment through writing. *Science Scope, 35*(5), 38. Retrieved from Education Full Text

Council for Environmental Education. About growing up WILD. Retrieved from http://www.projectwild.org/GrowingUpWILD.htm

Council for Environmental Education and Western Association of Fish and Wildlife Agencies. (2000). *Project WILD K-12 activity guide* (3rd ed.). Houston, TX: Council for Environmental Education.

Council for Environmental Education & Western Association of Fish and Wildlife Agencies. (2007). *Proyecto WILD traducción en español de las guías del plan de estudios y actividades del jardín de niños hasta la preparatoria*. Houston, TX: Council for Environmental Education.

Cummins, J. (2000). *Language, power, and pedagogy: Bilingual children in the crossfire*. Clevedon, England: Multilingual Matters.

DePalma, R. (2010). *Language use in the two-way classroom: Lessons from a Spanish-English bilingual kindergarten*. Bristol: Mulilingual Matters.

Duhn, I. (2012). Making ‘place’ for ecological sustainability in early childhood education. *Environmental Education Research, 18*(1), 19-29. doi:10.1080/13504622.2011.572162

Ernst, J. A. (2012). Early childhood nature play: A needs assessment of Minnesota licensed childcare providers. *Journal of Interpretation Research, 17*(1), 7. Retrieved from Education Full Text

Evergreen Association. (2000). *Nature nurtures: Investigating the potential of school grounds.* Toronto: Evergreen.

Flock, E. (2013, March 29). Pro-English enthusiasts bluster ahead with official language push. *U.S. News & World Report.* Retrieved from http://www.usnews.com/news/blogs/washington-whispers/2013/03/29/meet-the-group-successfully-pushing-for-english-to-become-the-official-language-of-the-us-3

Freeman, Y. S., Freeman, D. E., & Mercuri, S. (2005). *Dual language essentials for teachers and administrators*. Portsmouth, NH: Heinemann.

Galotti, K. M. (2004). *Cognitive psychology in and out of the laboratory* (3rd ed.). Pacific Grove, CA: Wadsworth/Thompson.

García, E. E.. (2005). *Teaching and learning in two languages: Bilingualism & schooling in the United States*. New York: Teachers College Press.

García, O., & Baetens Beardsmore, H. (2009). *Bilingual education in the 21st century: A global perspective*. Malden, MA: Wiley-Blackwell Pub.

García, O., & Baker, C. (2007). *Bilingual education: An introductory reader*. Clevedon: Multilingual Matters.

Gilroy, M. (2002). Bilingual education on the edge. *Education Digest, 67*(5), 50-55. Retrieved from Education Full Text

Greene, J. P., & Tomás Rivera Policy Institute. (1998). *A meta-analysis of the effectiveness of bilingual education*. Claremont, CA: Tomás Rivera Policy Institute.

Gruenewald, D. A., & Smith, G. A. (2008). *Place-based education in the global age: Local diversity*. New York: Lawrence Erlbaum Associates.

Haas, M. (2000). Thematic, communicative language teaching in the K-8 classroom. *ERIC digest.* Retrieved from ERIC database (ED444380)

Hadi-Tabassum, S. (1999). Assessing students' attitudes & achievements in a multicultural & multilingual science classroom. *Multicultural Education, 7*(2), 15-20. Retrieved from Education Full Text

Hadi-Tabassum, S. (2004). The balancing act of bilingual immersion. *Educational Leadership, 62*(4), 50-55. Retrieved from Education Full Text

Haluza-DeLay, R. (2001). Remystifying the city: Reawakening the sense of wonder in our own backyards. *Thresholds in Education, 27*(3-4), 36-40.

Hamayan, E. V., Genesee, F., & Cloud, N. (2013). *Dual language instruction from A to Z: Practical guidance for teachers and administrators*. Portsmouth, NH: Heinemann.

Harr, N., Lee, R. E., & Jr. (2010). Nature detectives. *Science and Children, 48*(3), 34-39.

Hong, A., & Anderson, D. H. (2006). Barriers to participation for Latino people at Dodge Nature Center. *Journal of Environmental Education, 37*(4), 33-44. doi:10.3200/JOEE.37.4.33-44

Howard, E., Sugarman, J., Perdomo, M. & Adger, C. T. (2005). The two-way immersion toolkit. Retrieved from https://www.brown.edu/academics/education-alliance/sites/brown.edu.academics.education-alliance/files/publications/toolkit_all.pdf

Kirkland, L. D., & Patterson, J. (2005). Developing oral language in primary classrooms. *Early Childhood Education Journal, 32*(6), 391-395. doi:10.1007/s10643-005-0009-3

Krashen, S. D. (1999). *Condemned without a trial: Bogus arguments against bilingual education*. Portsmouth, NH: Heinemann.

Kudryavtsev A., Krasny, M. E. (2012). *Urban environmental education: Preliminary literature review* (Unpublished manuscript). Cornell University Civic Ecology Lab, Ithaca, NY.

Kudryavtsev, A., Stedman, R. C., & Krasny, M. E. (2012). Sense of place in environmental education. *Environmental Education Research, 18*(2), 229-250.

Kushmerick, A., Stein, S., & Young, L. (2007). Environmental justice content in mainstream US, 6-12 environmental education guides. *Environmental Education Research, 13*(3), 385-408. doi:10.1080/13504620701430745

Lessow-Hurley, J. (2009). *The foundations of dual language instruction*. Boston, MA: Pearson/Allyn and Bacon.

Marouli, C. (2002). Multicultural environmental education: Theory and practice. *Canadian Journal of Environmental Education, 7*(1), 26-42. Retrieved from ERIC database (EJ654589)

Martin, K. (2007). Multicultural environmental education. *Pathways: The Ontario Journal of Outdoor Education, 19*(4), 16. Retrieved from ERIC database (EJ899644)

McKee, J., & Ogle, D. (2005). *Integrating instruction: Literacy and science*. New York: Guilford Press.

Mills, G. E. (2011). *Action research: A guide for the teacher researcher* (4th ed.). Upper Saddle River, N.J: Pearson Merrill Prentice Hall.

Minnis, P., & Elisens, W. (2000). *Biodiversity and Native America.* Norman, OK: University of Oklahoma Press.

Morren López, M. (2012). Children's language ideologies in a first-grade dual-language class. *Journal of Early Childhood Literacy, 12*(2), 176-201. doi:10.1177/1468798411417077

Nation Science Teachers Association. (2003). Environmental education. Retrieved from http://www.nsta.org/about/positions/environmental.aspx

Nordström, H. (2008). Environmental education and multicultural education - too close to be separate? *International Research in Geographical and Environmental Education, 17*(2), 131-145. doi:10.1080/10382040802148604

North American Association for Environmental Education. (2010). Excellence in environmental education: Guidelines for learning (K-12). Retrieved from https://naaee.org/sites/default/files/eepro/products/files/gl_for_learning_k-12_complete.pdf

North American Association for Environmental Education. (n.d.). About EE and why it matters. Retrieved from https://naaee.org/about-us/about-ee-and-why-it-matters

Olson, J. K., & Clough, M. P. (2009). Keeping it real: Don't forget the importance of outdoor experiences in nature.(methods & strategies: Ideas and techniques to enhance your science teaching). *Science and Children, 46*(8), 53. Retrieved from Expanded Academic ASAP

Palmer, D. K. (2009). Middle-class English speakers in a two-way immersion bilingual classroom: “Everybody should be listening to Jonathan right now...”. *TESOL Quarterly, 43*(2), 177-202. Retrieved from http://www.jstor.org/stable/27785001

Palmer, J. (1998). *Environmental education in the 21st century: Theory, practice, progress and promise* (1st ed.). London: Routledge.

Potowski, K. (2004). Student Spanish use and investment in a dual immersion classroom: Implications for second language acquisition and heritage language maintenance. *Modern Language Journal, 88*(1), 75-101. doi:10.1111/j.0026-7902.2004.00219.x

Quintanar-Sarellana, R. (2004). ¡Si se puede! academic excellence and bilingual competency in a K-8 two-way dual immersion program. *Journal of Latinos & Education, 3*(2), 87-102. doi:10.1207/s1532771xjle0302_3

Reese, L., Goldenberg, C., & Saunders, W. (2006). Variations in reading achievement among Spanish-speaking children in different language programs: Explanations and confounds. *Elementary School Journal, 106*(4), 363-385. doi:10.1086/503637

Rennie, S. (2008). Toward a 21st-century understanding of humans' relation to nature: Two hats? *The Journal of Environmental Education, 40*(1), 55-61. doi:10.3200/JOEE.40.1.55-61

Reyes, I., Kenner, C., Moll, L. C., & Orellana, M. F. (2012). Biliteracy among children and youths. *Reading Research Quarterly, 47*(3), 307-327. doi:10.1002/rrq.022

Reyes, S. A., & Crawford, J. (2012). *Diary of a bilingual school: How a constructivist curriculum, a multicultural perspective, and a commitment to dual immersion education combined to foster fluent bilingualism in Spanish and English-speaking children*. Portland, OR: DiversityLearningK12.

Roca, A., & Colombi, M. C. (2003). *Mi lengua: Spanish as a heritage language in the United States, research and practice*. Washington, D.C.: Georgetown University Press.

Rossell, C. (2005). Meta-murky: A rebuttal to recent meta-analyses of bilingual education. In J. Söhn (Ed.), *The effectiveness of bilingual school programs for immigrant children* (pp. 43-76). Berlin: WZB. Retrieved from http://www.bu.edu/polisci/files/2009/09/Meta-Murky-A-Rebuttal-to-Recent-Meta-Analyses-of-Bilingual-Education.pdf

Rossell, C. H., & Baker, K. (1996). The educational effectiveness of bilingual education. *Research in the Teaching of English, 30*(1), 7-74. Retrieved from http://ezproxy.hamline.edu:2087/stable/40171543

Rosso White, G. A. (2011). Oral language instruction in Spanish: A study of first-grade Spanish speakers in a dual immersion program. *Hamline School of Education Student Capstones and Dissertations.* Retrieved from http://digitalcommons.hamline.edu/hse_all/452

Rubinstein-Avila, E. (2002). Problematizing the "Dual" in a dual-immersion program: A portrait. *Linguistics and Education, 13*(1), 65-87. doi:10.1016/S0898-5898(01)00064-X

Schecter, S. R., & Cummins, J. (2003). *Multilingual education in practice: Using diversity as a resource*. Portsmouth, NH: Heinemann.

Sloan, C. (2013). Transforming multicultural classrooms through creative place-based learning. *Multicultural Education, 21*(1), 26. Retrieved from Education Full Text

Smith, G. A. (2002). Place-based education: Learning to be where we are. *Phi Delta Kappan, 83*(8), 584-94.

Smith, P. H. (2001). Community language resources in dual language schooling. *Bilingual Research Journal, 25*(3), 375-404. doi:10.1080/15235882.2001.10162799

Sobel, D. (1996). *Beyond ecophobia: Reclaiming the heart in nature education*. Great Barrington, MA: Orion Society.

Sobel, D. (2008). *Childhood and nature: Design principles for educators*. Portland, ME.: Stenhouse Publishers.

Sobel, D., & Orion Society. (2004). *Place-based education: Connecting classrooms & communities*. Great Barrington, MA: Orion Society.

Strife, S., & Downey, L. (2009). Childhood development and access to nature. *Organization & Environment, 22*(1), 99-122.

Thomas, W. P. & Collier, V. P. (1997). *School effectiveness for language minority students. NCBE resource collection series, no. 9.* Washington, DC: National Clearinghouse for Bilingual Education, George Washington University, Center for the Study of Language and Education. Retrieved from ERIC database (ED436087)

Thomas, W. P., & Collier, V. P. (2003). The multiple benefits of dual language. *Educational Leadership, 61*(2).

Tollefson, J. W. (1991). *Planning language, planning inequality: Language policy in the community*. London; New York: Longman.

Upadhyay, B. (2008). Elementary students' retention of environmental science knowledge: Connected science instruction versus direct instruction. *Journal of Elementary Science Education, 20*(2), 23.

Valdés, G. (1997). Dual-language immersion programs: A cautionary note concerning the education of language-minority students. *Harvard Educational Review, 67*, 391-429. Retrieved from ERIC database (EJ550234)

Warren, K., Roberts, N. S., Breunig, M., & Alvarez, M. A. G. (2014). Social justice in outdoor experiential education: A state of knowledge review. *Journal of Experiential Education, 37*(1), 89-103. doi:10.1177/1053825913518898

WIDA Consortium. (2013). Estándares del desarrollo del lenguaje español de WIDA. Madison, WI: Board of Regents of the University of Wisconsin System. Retrieved from https://www.wida.us/standards/sld.aspx

WIDA Consortium. (2012). 2012 Amplification of the English Language Development Standards. Madison, WI: Board of Regents of the University of Wisconsin System. Retrieved from https://www.wida.us/standards/eld.aspx

Wilke, R. J. (1993). *Environmental education teacher resource handbook: A practical guide for K-12 environmental education*. Arlington, VA; Millwood, NY: Kraus International Publications.

Wilson, R. A. (1995). Environmental education: Bringing the outdoors in. *Day Care & Early Education, 22*(4), 32-34.

Wilson, R. A. (2008). *Nature and young children: Encouraging creative play in natural environments*. London; New York: Routledge.

Zehr, M. A. (2008, June 6). Ten-year anniversary of Proposition 227. *Education Week.* Retrieved from http://blogs.edweek.org/edweek/learning-the-language/2008/06/tenyear_anniversary_of_proposi.html

Zelezny, L. C. (1999). Educational interventions that improve environmental behaviors: A meta-analysis. *Journal of Environmental Education, 31*(1), 5. Retrieved from ERIC database (EJ592055)

Appendix A: Interview Questions

Introduction:
Tengo algunas preguntas para ti acerca de tu hábitat y lo que aprendiste esta semana. Yo voy a grabar nuestra conversación para ayudarme a recordar lo que dijiste. ¿Está bien?

(I have some questions for you about your habitat and what you learned this week. I am going to record our conversation to help me remember what you said. Is that ok?)

Questions:

1. ¿Cómo hiciste tu hábitat? (How did you make your habitat?)
2. ¿Por qué elegiste este animal? (Why did you choose this animal?)
3. ¿Qué pusiste en su hábitat? ¿Por qué? (What did you put in its habitat? Why?)
4. ¿Qué necesita tu animal para vivir? (What does your animal need to live?)
5. ¿Qué aprendiste sobre tu animal cuando fuimos afuera? (What did you learn about your animal when we went outside?)
6. ¿Qué más vive alrededor de nuestra escuela? (What else lives around our school?)
7. ¿Te gustó ir afuera para observar esta semana? ¿Por qué sí o por qué no? (Did you like going outside to observe this week? Why or why not?)

8. ¿Cómo te sientes cuando estás afuera en la naturaleza? ¿Qué te gusta hacer en la naturaleza? (How do you feel when you are outside in nature? What do you like to do in nature?)
9. ¿Qué quieres que los demás niños de nuestra escuela sepan sobre los animales y las plantas que viven aquí? (What do you want the other kids at our school to know about the animals and plants that live here?)

As necessary, I may also use follow-up questions or prompts when students give short or incomplete answers. Prompts may vary based on student responses, but these basic questions come from the reading assessment used at our school:

Dime más. (Tell me more.)

¿Por qué piensas así? (Why do you think that?)

¿Por qué es importante eso? (Why is that important?)

Appendix B: Consent Letters

Monday, February 22, 2016

Dear Parent or Guardian:

I am a graduate student completing a master's degree in education at Hamline University here in Saint Paul. As part of my work, I hope to conduct research in my classroom during the month of April, 2016. I am writing this letter to ask your permission for your child to participate in my research.

My project involves observing nature and learning about animal habitats around our school. All students will participate in observing the natural environment around our school and presenting what they discover. During the last lesson, students will create a diorama habitat for one of these animals we observed around the school.

All students will participate in observing, learning vocabulary, creating lists of observations and completing the habitat diorama, which are standard first grade activities. For students with permission to participate in the research, I may conduct a short individual interview about the diorama they created, the things they learned during the unit, and how they feel about nature in order to help me understand the effectiveness of these lessons. I will audio-record their responses but the recording will not be included in the final product.

If your child participates in my research, his or her identity will be protected. No real names or identifying characteristics will be used. Only transcripts of the interviews will be included, not the recordings themselves. Participant grades will not be affected by the interviews or the analysis of their dioramas. All results will be confidential and anonymous. This eliminates risks for your child and other participants. In addition, you or your child may decide not to participate at any time without any negative consequences.

I have received permission to do this research from our principal and from the [redacted] Department of Research, Evaluation and Assessment, as well as the Hamline University Graduate School of Education. This project is public scholarship and both the abstract and final product will be included in the Bush Library Digital Commons, which means that other teachers and researchers can search for it and read it online.

The research may also be used in education publications or reports in the future. In all cases, your child's identity will not be divulged.

If you consent to your child's participation, keep this page and return the permission form on the second page by March 8 (the other side of this pages has a copy for your records). If you have any questions, please call me at [redacted] or email me at [redacted]. Thank you for your help with this project.

Sincerely,
Annaka Larson

Informed Consent to Participate in Qualitative Research
(Keep this page for your records)

I have received your letter about the research you plan to conduct in which you will be observing students' learning about animal habitats. I understand there is little to no risk for my child, that his/her identity will be protected, and that I may withdraw or my child may withdraw from the research at any time.

_____ _____
Parent name (print) Date

_____
Parent signature

Informed Consent to Participate in Qualitative Research
(Return this page to Annaka Larson)

I have received your letter about the research you plan to conduct in which you will be observing students' learning about animal habitats. I understand there is little to no risk for my child, that his/her identity will be protected, and that I may withdraw or my child may withdraw from the research at any time.

_____ _____

Parent name (print) Date

_____

Parent signature

22 de febrero de 2016

Estimado Padre o Tutor:

Yo soy estudiante de posgrado completando una maestría de la educación en la Universidad de Hamline aquí en Saint Paul. Espero realizar un proyecto de investigación en mi salón durante el mes de abril, 2016. Estoy escribiendo esta carta para pedir permiso para que participe su hijo/a en mis estudios.

Mi proyecto supone observar la naturaleza y aprender acerca de los hábitats de los animales alrededor de nuestra escuela. Todos los estudiantes participarán en la observación del medioambiente alrededor de la escuela y la presentación de lo que descubren. Durante la última lección, los estudiantes crearán una diorama de un hábitat para uno de los animales que observamos alrededor de la escuela.

Todos los estudiantes participarán en observar, aprender vocabulario, crear listas de observaciones y completar la diorama de un hábitat, cuales son actividades estándares de primer grado. Para los estudiantes que tienen permiso para participar en la investigación, puede que haga una entrevista individual corta acerca de la diorama que crearon, las cosas que aprendieron durante la unidad y cómo se sienten sobre la naturaleza para ayudarme a entender la eficacia de estas lecciones. Yo grabaré de audio las entrevistas para poder analizar sus respuestas, pero la grabación no será incluida en el producto final.

Si su hijo/a participe en mi investigación, su identidad estará protegida. No se usarán nombres verdaderos ni información identificativa. Sólo transcripciones de las entrevistas serán incluidas, no las grabaciones. Las notas de los participantes no estarán afectadas por las entrevistas ni por el análisis de sus dioramas. Todos los resultados serán confidenciales y anónimos. Esto elimina los riesgos para su hijo/a y los otros participantes. Usted o su hijo/a también puede decidir que no quiere participar en cualquier momento.

Yo he recibido permiso para realizar este proyecto de investigación de nuestra directora y del Departamento de Investigaciones, Valoraciones y Evaluaciones de [redacted], además de la Escuela de Postgrado de la Educación de la Universidad de Hamline. Este proyecto es escolaridad pública y ambos el resumen y el producto final será incluida en Bush Digital Commons, que significa que otros maestros e investigadores podrán buscarla y leerla en línea. La investigación también podría ser utilizada en publicaciones o reportes educativos en el futuro. En todo caso, la identidad de su hijo/a no será divulgada.

Si usted accede a la participación de su hijo/a, guarde esta página y devuelva el formulario de permiso en la segunda página para el 8 de marzo (el revés de esta hoja tiene una copia para sus archivos). Si tiene preguntas, me puede llamar en [redacted]

[redacted] o mandar un correo electrónico en [redacted]. Gracias por su ayuda con este proyecto.

Atentamente,
Annaka Larson

Consentimiento informado para participar en una investigación cualitativa
(Guarde esta página para archivar)

Yo he recibido su carta acerca de la investigación que planea realizar en el cual observará el aprendizaje de los estudiantes sobre los hábitats de animales. Yo entiendo que hay poco o ningún riesgo para mi hijo/a, que su identidad será protegida y que yo puedo retirar o mi hijo/a puede retirarse en cualquier momento.

_____ _____
Nombre del padre, madre o tutor Fecha

_____
Firma del padre, madre o tutor

Consentimiento informado para participar en una investigación cualitativa
(Devuelva esta página a Annaka Larson)

Yo he recibido su carta acerca del proyecto de investigación que planea realizar en el cual se observará el aprendizaje de los estudiantes sobre los hábitats de animales. Yo entiendo que hay poco o ningún riesgo para mi hijo/a, que su identidad será protegida y que yo puedo retirar o mi hijo/a puede retirarse en cualquier momento.

_____ _____

Nombre del padre, madre o tutor Fecha

_____

Firma del padre, madre o tutor

Appendix C: Blank Unit Plan

<table>
<tr><td colspan="2"><u>Unit Theme/Topic:</u>

Guiding Questions:

Time Frame:</td></tr>
<tr><td>Content Standards:</td><td>Language Standards:</td></tr>
<tr><td>Content Objectives:</td><td>Language Learning Goal:

Vocabulary level:
Sentence level:
Discourse level:

Language Objectives:

Language Functions:</td></tr>
<tr><td colspan="2">Cross-Cultural Objectives:</td></tr>
</table>

Adapted from Hamayan, E. V., Genesee, F., & Cloud, N. (2013).

<table>
<tr><td colspan="2">Materials:</td></tr>
<tr><td colspan="2">Background Knowledge Needed:</td></tr>
<tr><td>Major Teaching Activities:
Preview Phase:

Focused Learning Phase:

Extension Phase:</td><td>Grouping Arrangements:</td></tr>
<tr><td colspan="2">Extensions to Language Arts:</td></tr>
<tr><td colspan="2">Assessments:
Formative:
Summative:</td></tr>
</table>

Adapted from Hamayan, E. V., Genesee, F., & Cloud, N. (2013).

Appendix D: Animal Habitat Unit Plan

<table>
<tr><td colspan="2">Unit Theme/Topic: Animal Habitats

Guiding Questions:
¿Cómo observan su ambiente los científicos? (How do scientists observe their environment?)
¿Qué materias naturales y vida salvaje están alrededor de nosotros? (What natural materials and wildlife are around us?)
¿Qué necesitan los seres vivos para sobrevivir? (What do living things need to survive?)

Time Frame: early April 2016 (one week of lessons) before starting nonfiction books in writing</td></tr>
<tr><td>Content Standards: Minnesota Academic Standards in Science, 2009:

Standard: Scientists work as individuals and in groups to investigate the natural world, emphasizing evidence and communicating with others.

Benchmark 1.1.1.1.1 When asked "How do You Know?", students support their answer with observations. For example: Use observations to tell why a squirrel is a living thing.

Benchmark 1.1.1.1.2 Recognize that describing things as accurately as possible is important in science because it enables people to compare their observations with those of others.

Standard: Natural systems have many components that interact to maintain the system.</td><td>Language Standards: Minnesota Academic Standards in English Language Arts, 2010:

1.6.2.2 Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure.

1.6.8.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

1.8.4.4 Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.

1.10.6.6 Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using frequently occurring conjunctions to signal simple</td></tr>
</table>

Benchmark 1.4.2.1.1. Recognize that animals need space, water, food, shelter and air. Benchmark 1.4.2.1.2 Describe ways in which an animal's habitat provides for its basic needs. For example: Compare students' houses with animal habitats.	relationships (e.g.,because).
Content Objectives: Students will describe what they notice in the environment as a result of detailed observation. (Lesson 1) Students will give reasons for the importance of looking closely at any environment and describing it. (Lesson 1) Students will use their observations as evidence to infer what kinds of wildlife are living around our school. (2) Students will generalize that people and other animals share a basic need to have a home. (3) Students will identify their own basic needs for food, water, shelter and space in a suitable arrangement, and will generalize that wildlife and other animals have similar basic needs. (4) Students will describe an animal´s habitat that they observe around our school, focusing on how the animal finds food, water, shelter and space. (3-4)	**Language Learning Goal:** Students will be able to describe what a specific animal needs in its habitat and why, using scientific vocabulary. **Vocabulary level:** vida salvaje, hábitat, alimento, types of animals, descriptive words, positional prepositions **Sentence level:** Descriptive sentences. Using ´because...´ to explain thinking. Sentences with prepositions (The bird lives *in* the nest) **Discourse level:** Using multiple sentences, explain the parts of a habitat and why they are important to an animal´s survival. **Language Objectives:** Students will be able to identify common local wildlife and earth materials in Spanish. Students will be able to use prepositional phrases to describe where an animal lives. Students will be able to use descriptive language to communicate their observations.

	Language Functions: Create Identify Apply Describe Explain
Cross-Cultural Objectives: Understanding that many of the same livings things we find in Minnesota exist in other parts of the world, and may have many different names and meanings for the people who live near them.	
Materials: class set of clipboards; pencils and paper Magnifying glasses	
Background Knowledge Needed: Prepositions Understanding of what it means to "observe" Understanding of environment (ambiente) Procedure and expectations for working outside	
Major Teaching Activities:	**Grouping Arrangements:**
Preview Phase:	
Record everything students remember from a familiar bookshelf that has been covered; compare to our observations after uncovering the area. (1)	In mixed-ability partnerships; share out with the whole group
Observe one spot outside using all the senses; share and chart our observations. (1)	Observe individually, share in partners and with whole group
Look for signs of wildlife in our classroom; discuss what we discovered. (2)	Individually, then whole group discussion.
Focused Learning Phase:	
Search outside for evidence of animals living around the school; chart observations. (2)	Assigned partners; whole group discussion.
Generate a chart of what people and wildlife need to live; categorize by food,	Turn and talk with assigned partners, then whole group discussion

water, shelter, space (3) Introduce concept of habitat: food, water, shelter and space arranged to meet an animal´s needs. Draw a habitat for a person, labeling food, water, shelter and space Choose an animal from our list and observe its habitat outdoors to determine how it might find food, water, shelter and space Create a chart of animals around our school and how they find the things they need in their habitat Draw an animal´s habitat outside, labeling necessary parts of the habitat *Extension Phase:* Create Habitat Dioramas	Whole group discussion Heterogenous groups of 2-3 In pairs Whole group Individually Individually
Extensions to Language Arts: This mini-unit will extend into our Expert Book unit in writer's workshop. Students will use the knowledge base they have acquired to write informational texts about one of the animals that we have observed.	
Assessments: *Formative:* Student observations Oral responses in student discussions *Summative:* Habitat Diorama Expert Book Individual Interviews	

Appendix E: Animal Habitat Lesson Plans

Lección 1

Adaptado de “Learning to Look, Learning to See” de Project WILD

Objetivo: Los estudiantes podrán observar un lugar del medioambiente y describir lo que observan.

Estándares de Minnesota
Ciencias:
Benchmark 1.1.1.1.1 When asked "How do You Know?", students support their answer with observations. For example: Use observations to tell why a squirrel is a living thing.

Benchmark 1.1.1.1.2 Recognize that describing things as accurately as possible is important in science because it enables people to compare their observations with those of others.

English Language Arts:
1.6.8.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

1.8.4.4 Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.

1.10.6.6 Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using frequently occurring conjunctions to signal simple relationships (e.g.,because).

Preguntas
¿Cómo observan el medioambiente los científicos?
¿Qué materias naturales y vida salvaje están alrededor de nosotros?

Materiales
Manta o sábana para cubrir un librero del salón
Tableros
Hoja de observaciones #1
Lápices

Actividades de aprendizaje

1. Explique que nosotros vamos a investigar nuestro medioambiente como científicos. Repase qué es un científico y qué hemos hecho en la clase de ciencias este año para investigar.

2. Introduzca el objetivo de hoy: observar un lugar afuera, en nuestro medioambiente. Explicamos qué es el medioambiente: toda la tierra, plantas, animales, personas, y otros materiales naturales alrededor de nosotros.

3. Demuestre la importancia de la observación: pregunte a la clase qué está en el librero. Anote sus respuestas. Después descubra el librero para ver si hubiera cosas que no se acordaron. Explique que los científicos usan todos los sentidos para observar y no dependen de sus recuerdos ni sus adivinanzas.

4. Explique las expectativas de observar en el medioambiente. Los estudiantes tienen que buscar un lugar donde pueden sentarse solos y van a mirar, escuchar, tocar y oler lo que pueden sin levantarse por algunos minutos. Repase nuestras reglas y cómo vamos a cuidar las cosas que encontramos. Vayan al lugar de observación y permita que transcurra suficiente tiempo para enfocarse, 4-6 minutos.

5. Reúna la clase y pídales que compartan lo que observaron en parejas. Explique que ahora deben dibujar y escribir sus observaciones. Reparta los tableros y la hoja de observaciones #1 y pídales que regresen a los mismos lugares para anotar sus observaciones.

6. Regrese al salón con sus observaciones. Cree una tabla de las observaciones de la clase. Pregunte a los estudiantes, ¿Qué hicieron para observar? ¿Cómo se enfocaron en el lugar donde estuvieron? ¿Vieron algo que los sorprendieron?

7. Repase las preguntas que hicimos al principio. Recuerde a los estudiantes que ellos son científicos porque están observando y describiendo el medioambiente. Ellos también notarán más cosas interesantes y hermosas por observar nuestro medioambiente.

Evaluación

1. Hojas de observaciones individuales
2. Tabla de observaciones de la clase
3. Observaciones informales del lenguaje oral de los estudiantes

Nombre: _____

Observaciones #1

Yo veo…	
Yo oigo…	
Yo toco…	
Yo huelo…	

Lección 2

Adaptado de “Wildlife is Everywhere!” de Project WILD

Objetivo: Los estudiantes podrán usar sus observaciones como evidencia para inferir qué tipos de vida salvaje viven en el medioambiente alrededor de nuestra escuela.

Estándares de Minnesota
Science:
Benchmark 1.1.1.1.1 When asked "How do You Know?", students support their answer with observations. For example: Use observations to tell why a squirrel is a living thing.

Benchmark 1.1.1.1.2 Recognize that describing things as accurately as possible is important in science because it enables people to compare their observations with those of others.

English Language Arts:
1.6.8.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

1.8.4.4 Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.

1.10.6.6 Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using frequently occurring conjunctions to signal simple relationships (e.g.,because).

Preguntas
¿Cómo observan su medioambiente los científicos?
¿Qué materias naturales y vida salvaje están alrededor de nosotros?

Materiales
Tableros
Hoja de observaciones #2
Lápices

Actividades de aprendizaje

1. Pregunte a la clase, ¿De qué te recuerdan las palabras ´vida salvaje´? ¿En qué te hace pensar? Comparta varias respuestas de los estudiantes.
2. Explique que ´vida salvaje´ significa todos los animales y seres vivos que no son domesticados, es decir, no son mascotas ni animales de la granja. ´Vida salvaje´ puede ser animales grandes, pero también incluye aves, insectos, hasta los microbios y otros organismos que no podemos ver. Hay vida salvaje alrededor de nosotros todo el tiempo, en casa, en la escuela, y también en nuestro salón.
3. Explique que vamos a buscar evidencia de la vida salvaje en nuestro salón. Tal vez veremos la vida salvaje o tal vez encontraremos pistas de la vida salvaje.

Pregunte a la clase si ellos han visto evidencia de un animal en el salón y comparta algunos ejemplos, mostrándoles cómo anotar la evidencia y el animal en la hoja de observaciones #2. Después de 1-2 minutos, reúna la clase y comparta lo que han encontrado.

4. En parejas, caminen afuera al lugar que van a observar. Reparta la hoja de observaciones y los tableros. Por diez minutos, busquen vida salvaje que pueden ver y la evidencia de vida salvaje, y su inferencia de cuál animal es.
5. Regrese al salón con sus observaciones. Cree dos listas de las observaciones de la clase: una lista de vida salvaje que observamos, y otra de evidencia de vida salvaje. Si un estudiante no sabe cómo se llama un animal, pregunte a los demás y anote una descripción del animal. Pregunte a los estudiantes si hay otros animales que pensaron que íbamos a ver y no los vimos. ¿Por qué creen que no encontramos evidencia de esos animales?

Evaluación

1. Hojas de observaciones individuales
2. Tabla de observaciones de la clase
3. Observaciones informales de lenguaje oral de los estudiantes

Nombre: _____

Observaciones #2

Vida salvaje que yo vi

Evidencia de vida salvaje	¿De qué animal es?

Lección 3

Adaptado de “Everybody Needs a Home” de Project WILD

Objetivo: Los estudiantes podrán identificar y describir el hábitat de un animal alrededor de nuestra escuela.

Estándares de Minnesota
Science:
Benchmark 1.4.2.1.1. Recognize that animals need space, water, food, shelter and air.

Benchmark 1.4.2.1.2 Describe ways in which an animal's habitat provides for its basic needs. For example: Compare students' houses with animal habitats.

English Language Arts:
1.6.8.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

1.8.4.4 Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.

1.10.6.6 Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using frequently occurring conjunctions to signal simple relationships (e.g.,because).

Preguntas
¿Qué necesitan los seres vivos para sobrevivir?

Materiales
Tableros
Hoja de observaciones #3
Lápices

Actividades de aprendizaje

1. Lea la pregunta de hoy, ¿Qué necesitan los seres vivos para sobrevivir? Explique el significado de sobrevivir: poder vivir. Hoy, además de estudiar los animales, vamos a investigar sus hogares. Los científicos llaman el hogar de un animal su ´hábitat.´
2. Pregunte a los estudiantes, ¿Qué necesitan las personas para vivir? Cree una lista de nuestros necesidades. Cree dibujos de nuestros hogares, o hábitats (hoja de observaciones #3). Ańimeles a los estudiantes que incluyan sólo las cosas que necesitan en sus casas para sobrevivir.
3. En parejas, comparta algunas cosas que incluyeron en sus dibujos.
4. Relea la lista de vida salvaje que hicieron ayer. Elija animales para dibujar su hábitat afuera y escriba el animal en el otro lado de la hoja de observaciones #3. Haga una lista de cada estudiante y el animal que está estudiando. ¿Qué tipos de

materiales vamos a ver en sus hábitats? Haga una lista.

5. Camine afuera al lugar donde están observando. En la hoja de observaciones #3 los estudiantes van a dibujar y describir el hábitat de su animal.
6. Regrese al salón y explique que van a compartir sus dibujos con otros estudiantes que están estudiando el mismo animal. Pídales que compartan los dibujos y que incluyan detalles que tienen los demás.
7. Elija a alguien de cada grupo para compartir el hábitat de su animal y haga una lista. Pregunte los estudiantes, ¿Qué es su hábitat? ¿Dónde hace su casa? ¿Qué come? ¿Dónde encuentra agua?

Evaluación

1. Hojas de observaciones individuales #3
2. Observaciones informales de lenguaje oral de los estudiantes

Nombre: _____

Observaciones #3

Dibuja tu hábitat.

Nombre: _____

Observaciones #3

Mi animal: _____

Dibuja su hábitat.

Lección 4

Adaptado de "What's That, Habitat?" de Project WILD

Objetivo: Los estudiantes podrán identificar cinco esenciales necesidades de la supervivencia—el alimento, el agua, el resguardo, y el espacio, con una disposición apropiada—compartidos por todos los seres vivos.

Estándares de Minnesota
Science:
Benchmark 1.4.2.1.1. Recognize that animals need space, water, food, shelter and air.

Benchmark 1.4.2.1.2 Describe ways in which an animal's habitat provides for its basic needs. For example: Compare students' houses with animal habitats.

English Language Arts:
1.6.8.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

1.8.4.4 Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.

1.10.6.6 Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using frequently occurring conjunctions to signal simple relationships (e.g.,because).

Preguntas
¿Cómo observan su ambiente los científicos?
¿Qué materias naturales y seres vivos están alrededor de nosotros?
¿Qué necesitan los seres vivos para sobrevivir?

Materiales
Tableros
Hoja de observaciones #4
Lápices

Actividades de aprendizaje

1. Relea la lista de hábitats del día anterior. ¿Qué necesitan los seres vivos en su hábitat? Repase las listas de necesidades que empezamos.
2. Explique que hay cinco cosas, o componentes esenciales de un hábitat de las personas, las mascotas, y la vida salvaje—el alimento, el agua, el resguardo, y el espacio, con una disposición apropiada. Explique qué significa este vocabulario usando una hoja grande de papel.
3. Explique que hoy vamos a buscar cómo nuestros animales obtienen sus necesidades. Iremos afuera en grupos y dibujaremos cada componente esencial

del hábitat de nuestros animales. Tal vez no va a ser obvio, entonces van a buscar pistas y hacer inferencias para descubrir cómo su animal satisface las necesidades.

4. Cuando todos tienen sus predicciones, vayan afuera a observar. Anímeles que pongan etiquetas y descripciones en sus tablas. Pueden incluir palabras que escribimos otro día o pueden preguntar a sus compañeros si no saben una palabra.
5. En el salón, haga una tabla de las necesidades y cómo varios animales las satisfacen. Repase las preguntas esenciales para notar todo lo que hemos aprendido.

Evaluación

4. Hojas de observaciones individuales
5. Tabla de observaciones de la clase
6. Observaciones informales de lenguaje oral de los estudiantes

Nombre: _____

Observaciones #4

Mi animal: _____

el alimento	
el agua	
el resguardo	
el espacio	

Lección 5

Adaptado del programa “BioSmart” de la escuela

Objetivo: Los estudiantes podrán crear un diorama del hábitat de un animal específico, incluyendo las necesidades de la supervivencia.

Estándares de Minnesota
Science:
Benchmark 1.4.2.1.1. Recognize that animals need space, water, food, shelter and air.

Benchmark 1.4.2.1.2 Describe ways in which an animal's habitat provides for its basic needs. For example: Compare students' houses with animal habitats.

English Language Arts:
1.6.8.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

1.8.4.4 Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.

1.10.6.6 Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using frequently occurring conjunctions to signal simple relationships (e.g.,because).

Preguntas
¿Qué necesitan los seres vivos para sobrevivir?

Materiales
Cajas de cartón
Papel de colores
Tijeras
Marcadores
Pegamento
Cinta
Hojas y flores de plástico
Limpia pipas
Plastilina, divida en partes pequeñas (una para cada estudiante)

Actividades de aprendizaje

1. Repase los carteles de las lecciones previas, recordándoles a los estudiantes que deben de enfocarse en el animal que han estudiando.
2. Explique que hoy van a crear un hábitat para su animal en una caja de cartón y necesitan incluir todas las necesidades de la supervivencia.
3. Muestre un ejemplo de un diorama para que los estudiantes tengan una idea de cómo pueden usar los materiales.

4. Reparten los materiales (excepto la plastilina) y diga a los estudiantes que vayan a trabajar.
5. Ayude a todos con sus proyectos. Recuérdeles que pueden usar los carteles y sus hojas de observaciones si necesitan más ideas.
6. Cuando la mayoría de la clase ha completado sus dioramas, recoja los útiles y las tiras de papel. Demuestre cómo pueden hacer un animal con la plastilina y distribuye una bola de plastilina para cada estudiante.
7. Pegue los animales en los dioramas. Traigan los dioramas al círculo y deles a los estudiantes la oportunidad de compartir lo que pusieron en su hábitat y cómo lo hizo.

Evaluación

3. Dioramas individuales
4. Observaciones informales de lenguaje oral de los estudiantes