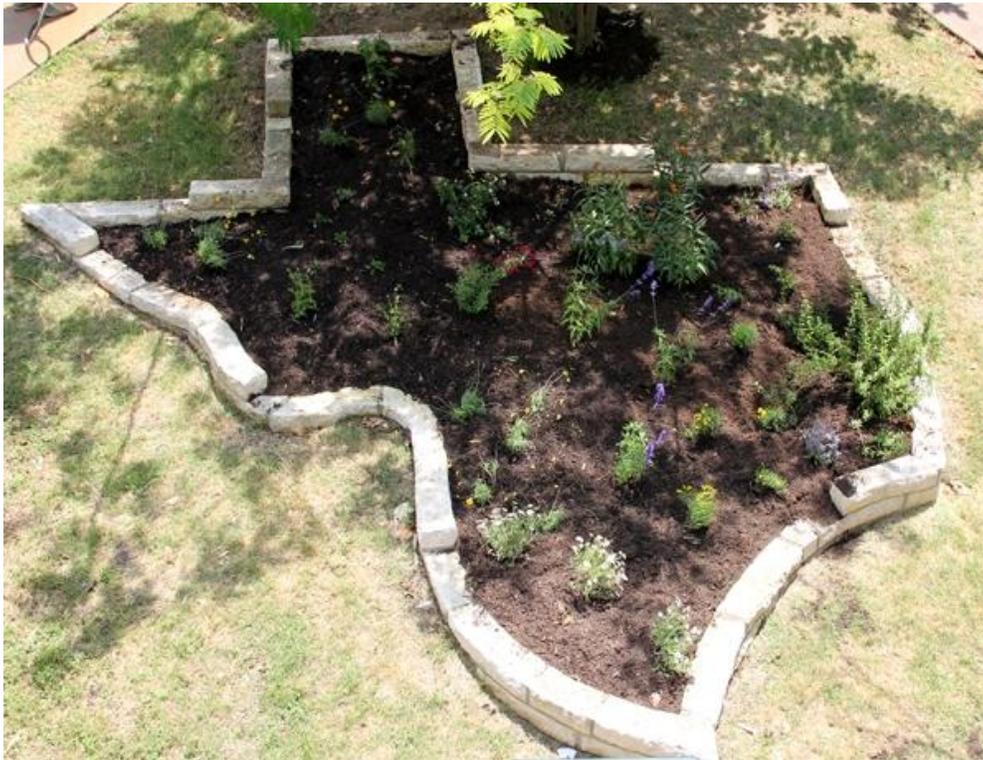


SCHOOLYARD HABITAT PROJECT
MIDDLE SCHOOL TEACHERS' SURVEY
YEAR 2
2011–2012



Executive Summary

In 2010, Austin Independent School District (AISD) began a 2-year partnership with the National Wildlife Federation (NWF) to train and support elementary and middle school campuses to establish outdoor learning classrooms in the form of natural habitats situated on school campuses. The main goals for the program were to improve science/mathematics (math) learning and motivation in kindergarten through 8th grade; increase the use of outdoor space for inquiry-based instruction; and to contribute to the reduction of achievement gaps in academic performance based on students' demographic characteristics (e.g., gender, race, ethnicity, and socioeconomic status). This report focuses on Year 2 of the project, the 2011–2012 academic year, and the middle school teacher teams who were involved in the SchoolYard Habitat (SYH) project. Nine middle school campuses in AISD participated in Year 2 of the NWF SYH program. Data for this report were collected from participating teachers through an online end-of-year survey ($n = 17$) and ongoing participation logs and lesson observation reports ($n = 226$) kept by teachers from the time they completed their initial training until the end of the year.

Teachers were asked a variety of questions about the mechanics of their involvement in this program, ranging from training to support and administrative support. They also were asked their opinions of the project and its potential to have a positive impact on students' achievement in science. Teachers reported that they attended an average of 3.5 days of training prior to beginning the habitat construction. Each campus team of educators created a diagram of their habitat plans, which they gave to the NWF for approval and feedback. After its plan was approved, the campus was provided \$2000 to purchase soil, plants and other materials. About one-third of teachers reported needing to spend longer planning than they actually did (an average of 11 hours). Half indicated they did not allocate enough time to the building phase (an average of 5 hours). Nearly all teachers were satisfied with the time spent maintaining the habitat (an average of 2 hours).

Campus administrators played an important role in enabling the SYH program's success. Teacher participants were asked to rate both their expectations for administrative support (i.e., how much support teachers expected from administrators) and the sufficiency of support they actually received from administrators. In most cases, the level of administrator support expected for labor, planning, resources, fundraising, and academic integration was *About What I Expected*. Sufficiency of administrator support, however, was skewed toward insufficiency. Compared with their answers to the question about expectation, many more reported it was *Insufficient to Our Needs*. The early career teachers were more likely to want and need more administrator support than were more experienced teachers or teachers with a Master's degree.

Teachers indicated the funding available through the NWF's SYH program was the primary factor that influenced their decision to build an outdoor classroom. This reason was stronger than personal environmental interests, student interests, the availability of an environmental curriculum aligned to learning standards, or the need to study environmental issues because of their inclusion in the state or local science learning standards. Realizing that the majority of teachers who became involved in the SYH program had some experience in environmental issues but were primarily motivated by the

availability of a mini-grant to build a habitat has implications for the SYH program organizers. Teachers who participate in the program are likely to have little knowledge and skill in environmental education prior to beginning the program and therefore need strong support from the NWF in terms of training and curriculum guidance if the program is to become institutionalized. It is wonderful to know that recruiting teachers to become involved in teaching students about environmental issues is a malleable pathway that can be influenced by the incentive of small grants to establish the outdoor classroom.

Observation and activity logs indicated how the SYH was used by teachers and students. Teachers reported that in the first year of campus participation in the program, about one-third of the time was devoted to building the actual habitat, one-third of the time was devoted to experimenting and using data, and one-third of the time was spent demonstrating or observing science concepts. The average student spent almost 9 hours in the habitat (hours ranged from 1 to 36 hours). Teachers reported the outdoor classroom was used an average of once per month for academic purposes and less than once per month for other types of formal learning (e.g., math lessons). Many teachers indicated they perceived the primary purpose of the habitat on their campus would be for academic instruction, but that it also would be used for activities such as afterschool club meetings (e.g., Green Team). Approximately 25% of teachers indicated it would only be used for academics.

Thirty-five percent of teachers used the materials and resources provided by the NWF to plan the content of lessons taught in their SYH. Forty percent of teachers used what they considered to be teacher-designed lessons. NWF curricular pieces have been aligned to the national science standards for learning and to the AISD curriculum materials, which in turn are aligned to the Texas learning standards. In AISD, the 7th-grade science curriculum fits better with the NWF materials designed for use with the habitat than do science curricula for other grades. Therefore, teachers were most likely to use the habitat to teach science lessons in grade 7. The materials made available to teachers typically required rewriting by teachers to make them classroom ready by AISD standards for lesson plans. In addition, many supplies had to be gathered when doing hands-on science experiments or activities. These two points were articulated by teachers in other data collection activities and on the survey as deterrents to more ready use of the habitat for teaching formal lessons. Because teachers envision the SYH as having a primarily academic purpose, the support needed to revise lesson plans to be teacher ready, and possibly some sort of organizational support to ready classroom kits of materials and equipment required by each lesson, would significantly bolster teachers' use of habitat to improve students' academic achievement. AISD is uniquely situated for such support because it offers teachers the assistance of staff at the Science Health Resource Center (SHRC), which houses a demonstration SYH and many supplies and materials, in addition to curriculum specialists' support and lesson plan ideas. Continued and even intensified collaboration between the SHRC science specialists and the NWF is recommended to facilitate appropriate and the frequent high-quality engagement of students with the habitats that have been established.

Teachers were asked to identify the activities most frequently conducted in the SYH. Teachers reported that their lessons in the SYH consisted primarily of readings about the environment (69%), followed by content that addressed the Texas Essential Knowledge and Skills (TEKS) or AISD

curriculum standards (56%); air, soil, or water environmental factors (50%); and science experiments related to the environment (44%). This activity report is good news because it shows that the habitat, even in its earliest uses, is fulfilling the purpose intended by the NWF, and more. Teachers' highest concern was learning to fit the lessons provided by the NWF to the existing curriculum standards, and yet it is still the second highest usage. Although this first year appeared to be largely about planning and planting, teachers reported environmental restoration (e.g., tree planting) to be only one-quarter of the activities conducted in SYH. Even in the construction year, the SYH helped teachers meet teaching expectations for science content.

Recommendations for future programming considerations and evaluation efforts include:

Expand SYH curriculum options and collaborate with AISD to provide class materials and equipment to allow for more time efficient preparation, and encourage teachers' use

Design a study to formally monitor use, and curriculum and student outcomes; give special attention given to teacher and students' characteristics and behaviors (e.g., planning time; lesson plans and implementation; and students' characteristics, participation, and academic benefits)

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Introduction

What is a SchoolYard Habitat (SYH)?

According to the National Wildlife Federation (NWF), this program assists schools in developing outdoor classrooms called Schoolyard Habitats®, where educators and students learn how to attract and support local wildlife. These wildlife habitats become places where students not only learn about wildlife species and ecosystems, but also outdoor classrooms where they hone their academic skills and nurture their innate curiosity and creativity.

NWF has encouraged conservation through wildlife habitats since 1973. In 1996, the Schoolyard Habitats® (SYH) program was created to meet the growing interest and needs of schools and districts in creating and restoring wildlife habitats on school grounds. The SYH program focuses specifically on assisting school communities in the use of school grounds as learning sites for wildlife conservation and cross-curricular learning.

Schoolyard Habitats® is a part of the National Wildlife Federation's Be Out There™ initiative, which aims to inspire families across America to open the door and get outside.

For more information, visit the [NWF website](#).

Campuses That Created a SYH in Year 2

Although Year 1 (2010–2011) saw participation by multiple elementary and middle schools, Year 2 (2011–2012) focused on only middle school campuses in the district. The nine participating middle school campuses in Year 2 included Bedichek, Covington, Garcia, Fulmore, Gorzycki, Murchison, Martin, Webb and Paredes. Each campus began participating through its principal, who volunteered that campus. At each campus, a team of approximately four to five teachers led the project (i.e., attending training, planning the site, coordinating efforts to build the Habitat, and instructing students in the Habitat upon its completion).

Team members at each campus who attended training events to participate in the SYH project were invited to complete a program survey about their experiences. Of the 34 teachers invited to complete the survey, a total of 17 teachers (46%) did so. This report summarizes the information gathered by the teacher survey and from observation logs kept throughout the 2011–2012 school

AISD SHY Program Goals and Objectives

Goal 1

Improve science/math learning (in kindergarten through 8th grade) by building SYHs to serve as hands-on, academic outdoor classrooms

Goal 2

Increase use of outdoor space for inquiry-based instruction

Goal 3

Reduce achievement gaps based on demographic test performance profiles in academics

Key Program Objective

Increase science knowledge and motivation in students through teacher's professional development opportunities and initial start-up costs that allow campuses to create and use unique outdoor learning spaces tailored to the needs, preferences, and curriculum of the campus

year by all teachers using the SYHs to teach science. Table 1 summarizes SYH participant teachers who completed the teacher survey, and also reports on program participants who did not respond to the survey (i.e., for comparison purposes and for consideration of the generalizability of those who did take the survey to all participating teachers). Demographics are included for the 31 SYH participant teachers who completed class observation logs to document their use of SYH to teach science. When all who provided feedback are considered, 34 of 37 teacher participants contributed input to this evaluation process.

Table 1. Year 2 SchoolYard Habitat (SYH) Teacher Participants

	Race/ ethnicity	Gender	Highest degree held	Certified science teacher	Years in AISD	Years of professional experience
Teachers completing survey (n = 17)	White = 14	Female = 12	BA = 13	24 separate science certifications (17 teachers)	Avg years in AISD = 9.9	Avg years professional experience = 11.2
	African American = *					
	Hispanic = *	Male = 5	MA = *	16 of 17 have some type of science certification	Range = 1, 30	Range = 1, 30
	Asian = *					
SYH participants who did not complete teacher survey (n = 17)	White = 11	Female = 13	BA=10	17 separate science certifications (17 teachers)	Avg years in AISD = 5.41	Avg years professional experience = 9
	African American = *					
	Hispanic = 5	Male = *	MA=7	13 of 17 have some type of science certification	Range = 1,11	Range = 1,17
	Asian = *					
Teachers completing observation/activity logs (n= 31; 17 survey responders plus 14 additional teachers)	White = 22	Female = 24	BA = 20	24 separate science certifications (31 teachers)	Avg years in AISD=6.81	Avg years professional experience = 9.65
	African American = *					
	Hispanic = 6	Male = 7	MA = 11	24 of 31 have some type of science certification	Range=1,26	Range = 1,28
	Asian = *					

Source. 2012 SYH Teacher Survey Note. * indicates n<5.

NWF and AISD Activities During Year 2

Teachers reported the amount of training provided as part of the SYH program. On average, most teachers received an average of 3.25 days of training. Teachers who completed the survey were asked to rate on a 5-point scale, with 5 being the highest, whether the level of training they received

was sufficient for the project. The average rating was 3.9, indicating teachers felt additional training would have been valuable to the process. One teacher remarked, “It was really hard to plan out and implement the plan for the habitat. [I recommend] a little more background on how to be a landscaper, contacts of people to buy supplies from, and more guidance on what plants to get and when to plant them.”

In addition to formal training sessions, program staff were available for other direct support services. Examples of these activities are presented in Table 2.

Table 2. SchoolYard Habitat (SYH) Teacher Support Activities, Year 2

SYH teacher activities	Min value	Max value	Average	Standard deviation
Used National Wildlife Federation or AISD Outdoor Learning Specialist for curriculum planning assistance [X] times	0	20	5.38	5.40
Used National Wildlife Federation or AISD Outdoor Learning Specialist for logistical and/or technical problem solving [X] times	0	12	4.06	3.80
Used National Wildlife Federation or AISD Outdoor Learning Specialist to access additional printed resources or materials [X] times	0	5	1.1	1.52
Borrowed equipment from NWF staff or SHRC [X] times	0	6	1	1.75
Facilitated activities or events when NWF or AISD Outdoor Learning Specialist worked directly with your students [X] times	0	5	1.5	1.63

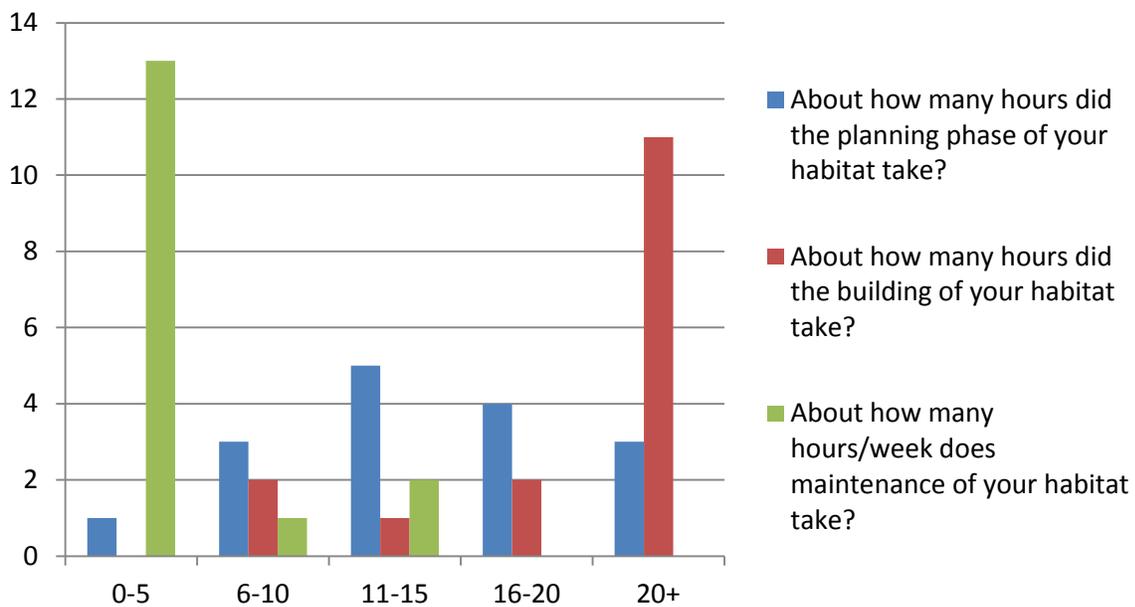
Source. 2012 SYH Teacher Survey

How the SYHs Were Built

SYH program activities included the planning and building of the habitat on each campus, as well as a demonstration habitat at the Science Health Resource Center (SHRC) building. Teachers reported about the planning, building, and maintaining of their campus habitat. On average, the SYH teams consisted of seven staff per campus and involved a range of 10 to 600 students; the average number of students involved on a single campus was 215. After receiving training, campus teams worked together to design their habitat, with support and assistance available from project staff, as needed. After submitting habitat plans to the NWF SYH staff for review and feedback, campuses were provided \$2000 to purchase plants, soil, and other materials needed to construct their outdoor learning habitat. Figure 1 shows the number of hours reported by survey participants to plan, build, and maintain their SYH. The typical campus spent about 11 hours planning its habitat, five hours building it, and a wide range from 1 to 13 hours per week maintaining it. The median number of hours reported for maintenance was 2, indicating that the campus reporting 13 hours a week in maintenance was not typical. One-third (33%) of teachers surveyed indicated they needed to spend longer in planning than they did. About one-half (53%) felt they did not allocate enough time to the building phase. Nearly all teachers reported being satisfied with the time spent in maintaining their SYH after it was built.

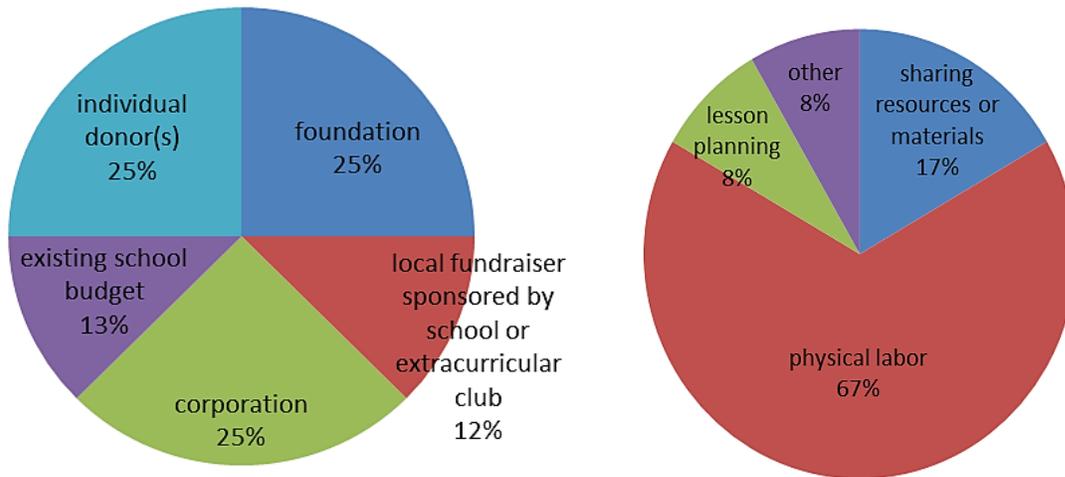
Several campuses received additional funding to build their Habitat according to their vision. Among AISD campuses involved in Year 2 of this project, 69% built their habitats using only the funds provided by the NWF. The remaining 31% obtained additional funding from one or more sources. Figure 2a illustrates the sources of external funding received by AISD campuses for their SYHs. The additional funding ranged from \$500 to \$5,000, to be used for a period of up to 6 months. The majority of campuses (78%) received in-kind resources or donations (e.g., labor and supplies). Most participating campuses (88%) also collaborated with other campuses or community groups to plan, build, and/or maintain their habitat. Figure 2b illustrates the types of collaborators with whom schools became involved during the SYH project. Collaborations generally took the form of sharing physical labor; however, sharing resources, materials, and lesson plans also was indicated.

Figure 1. Number of Hours Reported by Survey Participants to Plan, Build, and Maintain Their SchoolYard Habitat (SYH)



Source. 2012 SYH Teacher Survey

Figure 2. (a) Campus Sources of Additional SchoolYard Habitat (SYH) Funding (b) Collaborators on Campus SYH Projects, as Reported by Teachers



Source. 2012 SYH Teacher Survey

The Role of Campus Administration’s Support in Establishment of SYHs

In the case of AISD, campus administrators were the initial volunteers to engage with NWF. Through the campus administrator, a school became eligible to participate in the SYH program. Afterward, administrators designated a campus leadership team to pursue the project on behalf of the school. Teachers were asked to indicate their perceptions of administrators’ support for the SYH to gauge the role administrators played in this type of undertaking; this type of information might be useful for those who may be interested in replicating an SYH project on the own campus or in their own district. Table 3 provides teachers’ perceptions of campus administrators’ support across five areas: (a) labor; (b) planning; (c) resources; (d) fundraising; and (e) academic integration of the SYH into science, mathematics (math), or other curricula.

Table 3. Teachers’ Perceptions of Administrators’ Support: Five Aspects of the SchoolYard Habitat (SYH) Program

Administrators’ support	Expectations in terms of...	Sufficiency in terms of...
	Mean rating	Mean rating
Labor	2.18	1.77
Planning	2.06	1.92
Resources	2.06	1.69
Fundraising	2.27	1.58
Academic integration	2.13	1.75

Source. 2012 SYH Teacher Survey Note. Scale range was 0-3.

Campuses’ Level of Prior Experienced With Environmental Education

The campuses that elected to participate in the SYH aspired to become more environmentally active and to find ways to promote hands-on learning opportunities for students. Table 4 shows the results

of the survey question that asked teachers about the extent to which their campuses were already experienced in environmental education programs. In a related question, one half of all campuses indicated that they had no prior experience, formal or informal, in environmental education programs.

Table 4. Teachers' Responses for "To what extent has your campus formally implemented other environmental education programs prior to the SchoolYard Habitat?"

Answer	Bar	Percentage
Not at all		19%
Occasionally		56%
Frequently		25%
Total		100%

Source. 2012 SYH Teacher Survey

Of the 17 teachers who responded to the survey question probing why they decided to become involved in the SYHs, most ($n = 12$) stated that available funding from the NWF was their primary deciding factor. Less frequent responses included person environmental interests ($n = 2$), student concerns about the environment ($n = 1$), and the need to study environmental issues because they are present in learning standards ($n = 1$). This finding is interesting to note because fostering environmental education through outdoor learning environments can happen easily on virtually any campus. This research did not suggest that staff need a strong environmental awareness or advocacy prior to building a habitat. This calls to mind the phrase "If you build it, they will come." Realizing that the majority of teachers and campuses involved in the SYHs had some experience in environmental issues but were primarily motivated by the availability of a mini-grant to build their habitat, training and strong curriculum support must be integrated throughout the SYH activities.

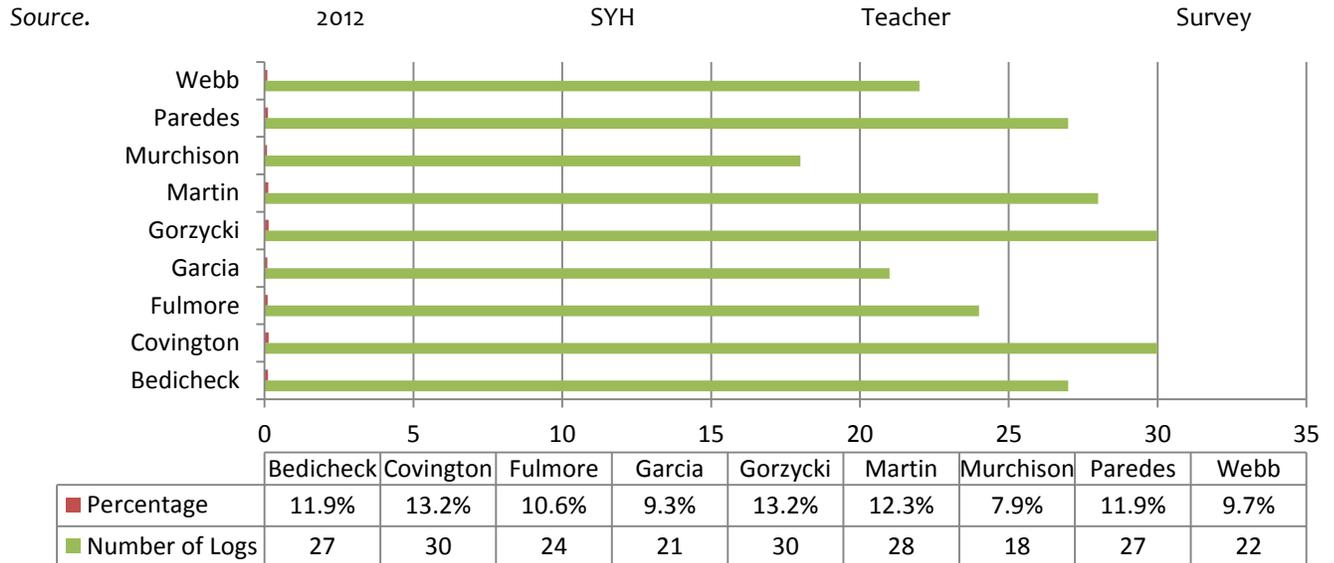
How SYHs Were Used by Campuses

After planning and building SYHs had been completed, teachers reported how they were using their outdoor learning spaces. They did so through their responses to survey questions as well as by completing an observation log after each lesson or activity conducted using the SYH. According to survey responses, by the end of the academic year, many campuses (50%) had completed the initial plans for their habitat and were in the maintenance phase of operation. One-quarter of teachers indicated they were in the planning phase, while another 25% indicated they had completed their initial development plans and were pursuing plans to further expand their SYH.

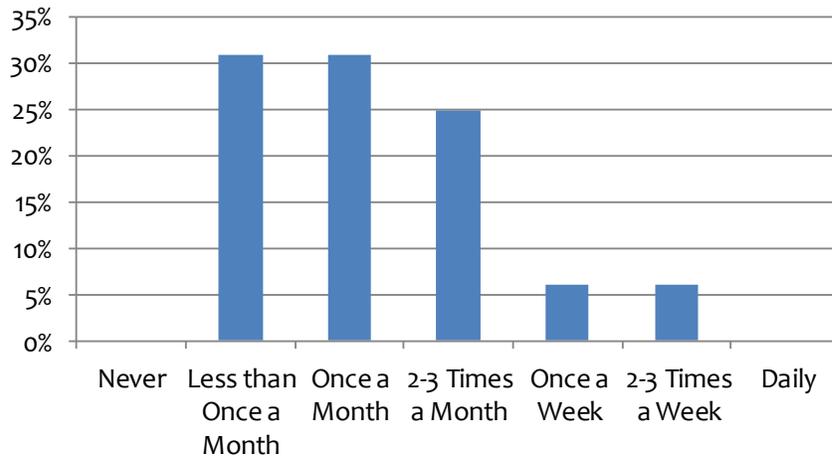
Of the 226 logs submitted by teachers using the SYH, campus participation was representative across schools. Figure 3 illustrates the number and percentages of observation logs submitted by teachers at the various campuses. Teachers at Covington and Gorzycki completed the highest number of observation logs (30), while Murchison teachers completed the lowest (18). These numbers are consistent with the varying levels of SYH completion (i.e., Covington and Gorzycki completed their habitats earlier than did Murchison, and therefore had more time to use their SYHs to teach lessons). However, teachers were instructed to complete activity logs even for the building phase if students were involved.

According to the logs submitted online using Survey Monkey (online survey software), during this initial year of participation in the SYH program, teachers involved students fairly equally in activities of planning/building (34%), experimenting and collecting data (36%), and demonstrating and observing science concepts (35%). These percentages do not equal precisely 100% due to overlap in lessons (i.e., one lesson could involve both science demonstration and SYH building).

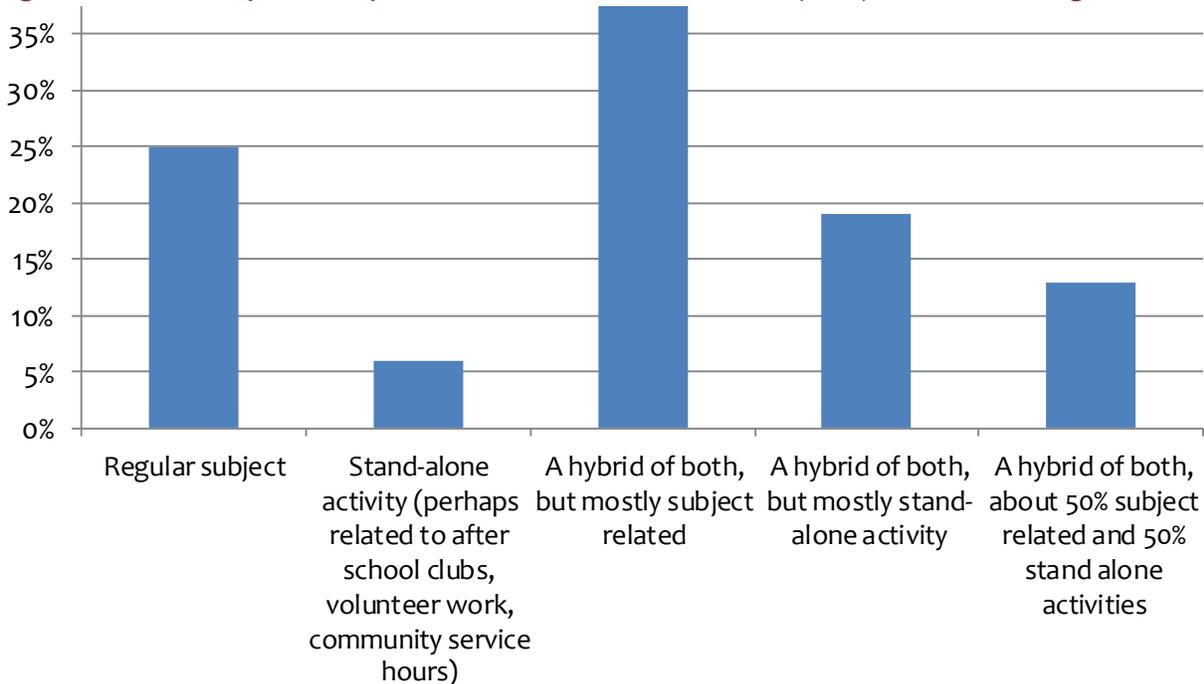
Figure 3. Observation Logs Submitted, by Campus, for Year 2



Teachers reported the average number of hours students spent in the outdoor learning space (both building it and learning in it) over the course of the year. The average time students spent in the SYHs was 8.67 hours, with a range from 1 hour to 36 hours. Teachers also reported the frequency with which the SYHs were used by all teachers on a campus. Figure 4 shows that the majority of teachers (38%) reported using the habitat an average of once per month for academic purposes and less than once a month for other types of formal activities. Figure 5 illustrates the teacher reported balance between using the habitat for academic teaching and other formal activities. The largest group of teachers (38%) saw the primary use of their SYH as academic in nature, although they took advantage of it for stand-alone activities (e.g., afterschool club meetings). One teacher in four (25%) reported that the SYH was used only for academic lessons.

Figure 4. Frequency of SchoolYard Habitat (SYH) Use with Students

Source. 2012 SYH Teacher Survey

Figure 5. Teachers' Reported Purposes for Which SchoolYard Habitats (SYHs) Were Used During 2011–2012

Source. 2012 SYH Teacher Survey

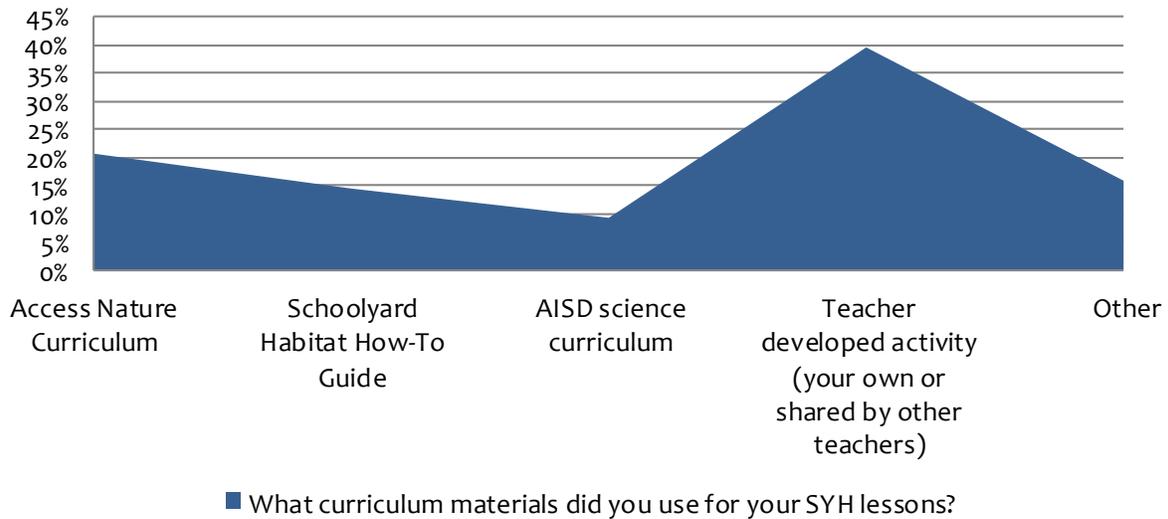
Curriculum Sources Teachers Used in the SYHs to Teach About the Environment

Two sources of information addressed the question of what materials or resources teachers used to develop the lessons they taught in the SYHs. On the observation logs, teachers answered the question “What source did you use to facilitate your lesson?” The results are shown in Figure 6. On the teacher survey, teachers were asked, “What best describes the types of curriculum materials you used for your SYH lessons?” The responses are shown in Figure 7. The sources available for selection

in the observation log more closely reflected the materials options available to teachers than did the overall teacher survey. The observation log choices included *Access Nature Curriculum*, a NWF curriculum resource that provides 45 hands-on, habitat-based activities (e.g., adaptations for students with disabilities), and *The How-To Guide for SchoolYard Habitats®*, which walks through the steps for creating a successful and sustainable wildlife garden, provides information about teaching in an outdoor classroom, and offers resources to help create and maintain a habitat. Teachers were provided both books, which are available through NWF (www.nwf.org), during training.

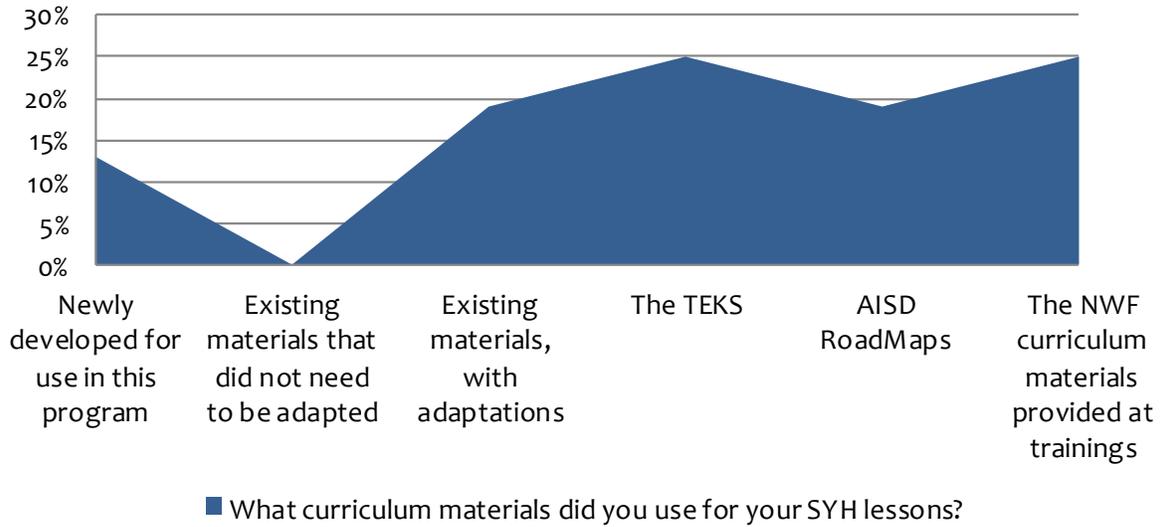
The AISD science curriculum is the district’s set of learning standards, also known as Curriculum Road Maps (CRMs). The CRMs were written by teams of AISD curriculum and learning specialists and teachers and are based on the newly implemented science Texas Essential Knowledge and Skills (TEKS). CRMs incorporate *Understanding by Design* (Wiggins & McTighe, 2005) methods and templates. During Year 1 and the fall of Year 2 of the SYH program in AISD, curriculum specialists from NWF and AISD worked together to align the district’s CRMs with the *Access Nature* curriculum (which is a national program, not specific to Texas). The process enabled teachers to locate lessons from the *Access Nature* curriculum that fit well with grade-specific TEKS and AISD learning standards. Teachers were required to prepare students to have mastered the learning standards at each grade level. When additional areas of learning present themselves disconnected from the CRMs and TEKS, teachers frequently do not have time to prepare lessons that incorporate the new learning content with the expected curriculum standards. Having the NWF curriculum materials aligned with the CRMs and TEKS made the likelihood of their use much greater for SYH teachers.

Figure 6. Curriculum Sources for Lessons Taught in the SYH Classroom, According to Observation Logs



Source. 2012 SYH Teacher Survey

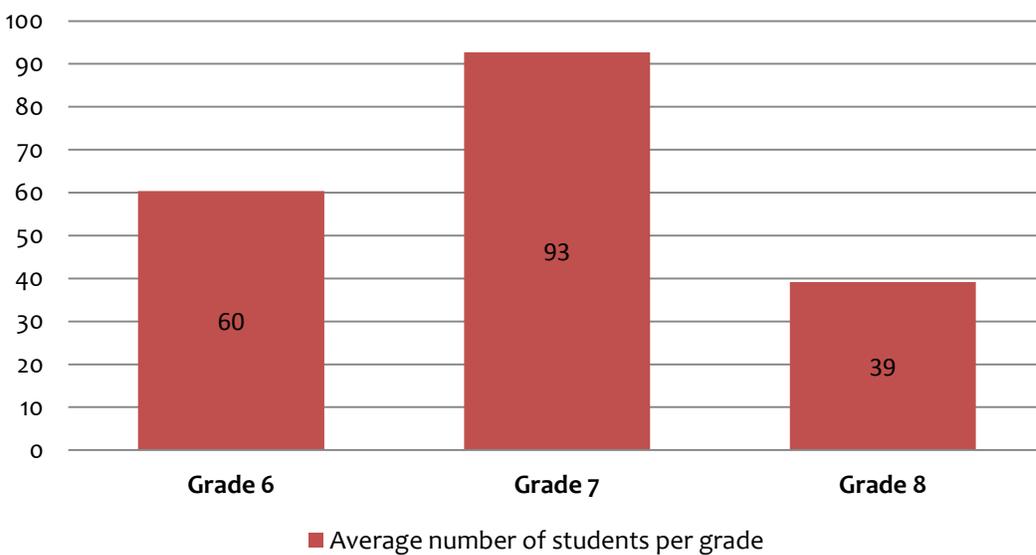
Figure 7. Materials Used by Teachers who Completed the Teacher Survey



Source. 2012 SYH Teacher Survey

During the process of aligning the materials and the standards, curriculum specialists learned that the NWF materials most naturally align with the 7th-grade science curriculum learning standards in Texas. Students’ survey results supported that teachers were most likely to use SYH lesson plans with grade 7 TEKS and CRMs. Teachers’ observation logs indicated that a total of 13, 535 7th-grade students received science instruction in the SYHs during Year 2 of the project (Figure 8). Likewise, 3,199 6th-grade students participated in the SYHs across all campuses, and 2,798 8th-grade students did so. The *How-To Guide for Schoolyard Habitats* and the *Access Nature curriculum* are both available through the National Wildlife Federation (www.nwf.org).

Figure 8. Average Number of Students Who Participated In Schoolyard Habitat (SYH) Lessons and Building Activities, By Grade Level



Source. 2012 SYH Teacher Survey

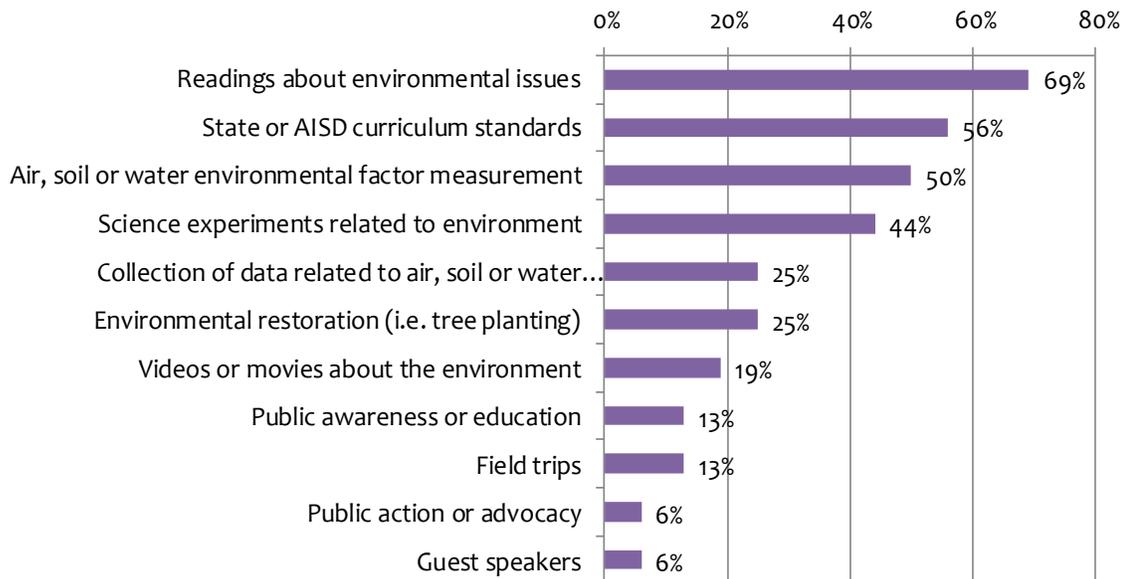
By contrast, the overall teacher survey asked generally if teachers used curriculum materials provided by the NWF, but probed more in depth about teacher-created lessons. The reason for this was that the teachers' observations and logs had revealed that nearly 40% of the lessons recorded in the logs were drawn primarily from teacher-created lessons. Therefore, the end-of-year survey asked teachers to indicate whether these lessons were being developed "from scratch"; from existing lesson plans obtained elsewhere that needed no adaptation before use (e.g., lessons from other environmental education curriculum, from Keep Austin Beautiful, or from the Internet); or from lesson plans obtained elsewhere that needed some adaptation to be useable. This differentiation assists in understanding how much time teachers found themselves dedicating to curriculum development in order to use the SYH after they had built it. From the information gathered, it appears teachers who answered the overall teacher survey were more likely than those completing logs to use the NWF and TEKS to structure their outdoor lesson plans. All teachers who completed the survey also completed observation logs. However, nearly twice the number of teachers completed observation logs as completed the survey, so some variations in response patterns were apparent with respect to the source of information. Most of the survey responders who used other types of lesson plans either wrote original lesson plans or used an existing lesson plan obtained elsewhere and adapted it for use in the SYH.

Teachers reported that because the structure of the NWF lessons significantly differed from that of the AISD lesson plan expectations, to be useful, the lessons needed substantially revision. Therefore, although the process of aligning the CRMs and TEKS with the NWF curriculum had occurred, teachers still felt the curriculum had limited usefulness in its present form. Several teachers recommended rewriting the lesson plans from the NWF curriculum books to comply with the AISD lesson plan's expectations to greatly increase the efficacy of structuring academic learning opportunities in the outdoor learning habitats. As an example, the present data made clear that the 7th-grade CRMs and TEKS aligned more readily with the NWF provided lessons than did CRMs and TEKS from other grades. That does not mean meaningful lesson plans cannot provide students in grades 6 and 8 the same outdoor learning opportunities as their 7th-grade counterparts. It does mean, however, that the grade 6 and grade 8 teachers must have significantly greater time and resources available to prepare lessons using the SYH well. Unfortunately, most teachers are "created equal" in the sense that few have such time or resources available. Further attention to curriculum design will assist in the ongoing institutionalization of this outdoor teaching resource now available on campuses.

Specific learning activities and lesson plan ideas used by teachers during the 2011–2012 school year are included in Figure 9. Teachers reported that their lessons in the SYH consisted primarily of readings about the environment (69%), followed by content that addressed the TEKS or AISD curriculum standards (56%); air, soil, or water environmental factors (50%); and science experiments related to the environment (44%). This activity report is good news because it shows that the habitat, even in its earliest uses, fulfilled the purpose intended by the NWF, and more. Teachers' highest concern was learning to fit the lessons provided by the NWF to the existing curriculum standards,

and yet it is still the second highest usage. Although this first year appeared to be largely about planning and planting, teachers reported environmental restoration (e.g., tree planting) to be only one-quarter of the activities conducted in the SYH. Even in the construction year, the SYH helped teachers meet teaching expectations for science content.

Figure 9. Learning Activities Conducted in Connection with the Schoolyard Habitat



Source. 2012 SYH Teacher Survey

Students' Benefits from Having an Outdoor Learning Environment on Their Campus

A complete student data companion report is available from the AISD Department of Research and Evaluation website (<http://www.austinisd.org/dre>). However, teachers were asked, both in their observation logs and in the teacher survey, to assess aspects of students' benefits. Because this program is in its infancy (i.e., the habitats required the better part of a year to train, plan, and build), clear academic impact will not be measurable until the teachers have had sufficient time to further develop curricular materials for use in the outdoor environment, which has not been an option for teaching in prior years. They will need time to learn how and where in the existing learning standards and curricular expectations this new learning milieu is best integrated.

Two aspects of students' benefits have been monitored throughout the initial phases of this project: academic learning and social-behavioral learning. With respect to academic learning, teachers were asked to consider statements such as "Using the habitat helps students understand science concepts." With respect to social learning, teachers were asked, for example, to rate students' social skills during outdoor activities and lessons. Table 5 provides teachers' average rating for students' behavior across all observed lessons, as well as the percentage of observed lessons assigned a rating of *very good* or *excellent*. As in Year 1, teachers reported lesson plans and students' academic and social behaviors through online observations and activity logs. In both years, students seemed to benefit from activity-based lessons that involved interdependence, collaborative problem solving,

and learning by doing. Teachers' comments about their lessons included the following: "A real advantage of having the SYH is that it meets the needs of diverse learners. Students who have a hard time interacting with other kids have a level playing field in the habitat lessons and do well using it. Like special education students, English language learners, and those who are shy or withdrawn." A strong recommendation for future study is to determine the differential impact of the SYH on student subgroups and the general academic impact of the SYH on students' achievement.

Table 5. Teachers' Ratings of Students' Social and Academic Behaviors during SchoolYard Habitat (SYH) Lessons

How would you rate the Social Skills your class demonstrated during this activity? This class...			
Answer Options:	Rating average	Percentage of lessons rated excellent or very good	Response Count
Actively engages in activity through participation and inquiry	4.04	78%	68
Demonstrates a positive attitude	4.18	84%	68
Focuses attention on task at hand	3.94	71%	68
Demonstrates self-regulation	3.76	62%	68
Demonstrates self-initiative and self-driven learning	3.70	57%	67
Provides assistance and/or collectively problem solves with others	3.87	68%	68
Displays respect for the habitat and environment	4.12	84%	68
Cooperates with teachers and students and is courteous	4.21	85%	68
Experiences low stress and engages in fun, creative learning	4.22	88%	68
How would you rate the Active Learning your class demonstrated during this activity? This class...			
Answer Options:	Rating average	Percentage of lessons rated excellent or very good	Response Count
Connects concepts learned in classroom to outdoor observations	3.98	69%	68
Displays curious exploration of habitat	4.26	81%	68
Taps into other learning styles not normally demonstrated in the classroom (kinesthetic, verbal)	4.22	73%	67
Actively listens and follows directions	4.00	63%	68
Demonstrates increased knowledge of ecosystems, wildlife, plants, human-natural world relationships	3.94	66%	68

Source. 2012 SYH Teacher Survey

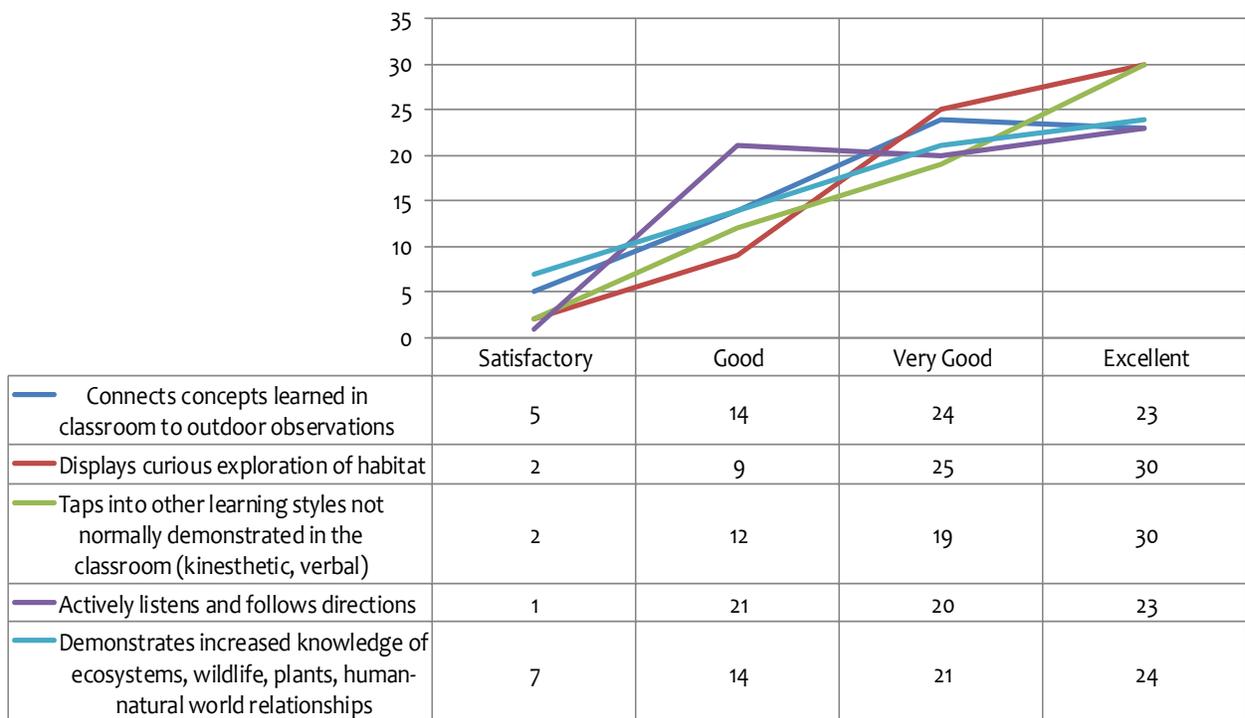
Note. Scale range was 0-5.

Figures 10 and 11 illustrate the behavioral ratings assigned by teachers during lessons. The left side of the graph shows how many times a class behavior rating of *poor*, *satisfactory*, *good*, *very good*, or *excellent* was assigned by a teacher (each "time" equals one observed lesson, so if a rating of *poor* was assigned seven times, it was assigned to seven separate lessons). Academic behaviors were rated by teachers in the same manner as were social skills. Specifically, each colored line records a teacher's ratings of the academic learning behaviors (Figure 10) or social skills (Figure 11) that were monitored.

Teachers seem to find that the outdoor learning habitat lent itself well to students’ behavior management and to providing opportunities for students to practice collaborative learning skills. Each colored line in Figure 11 records a teacher’s ratings of a particular social skill of interest during the lesson.

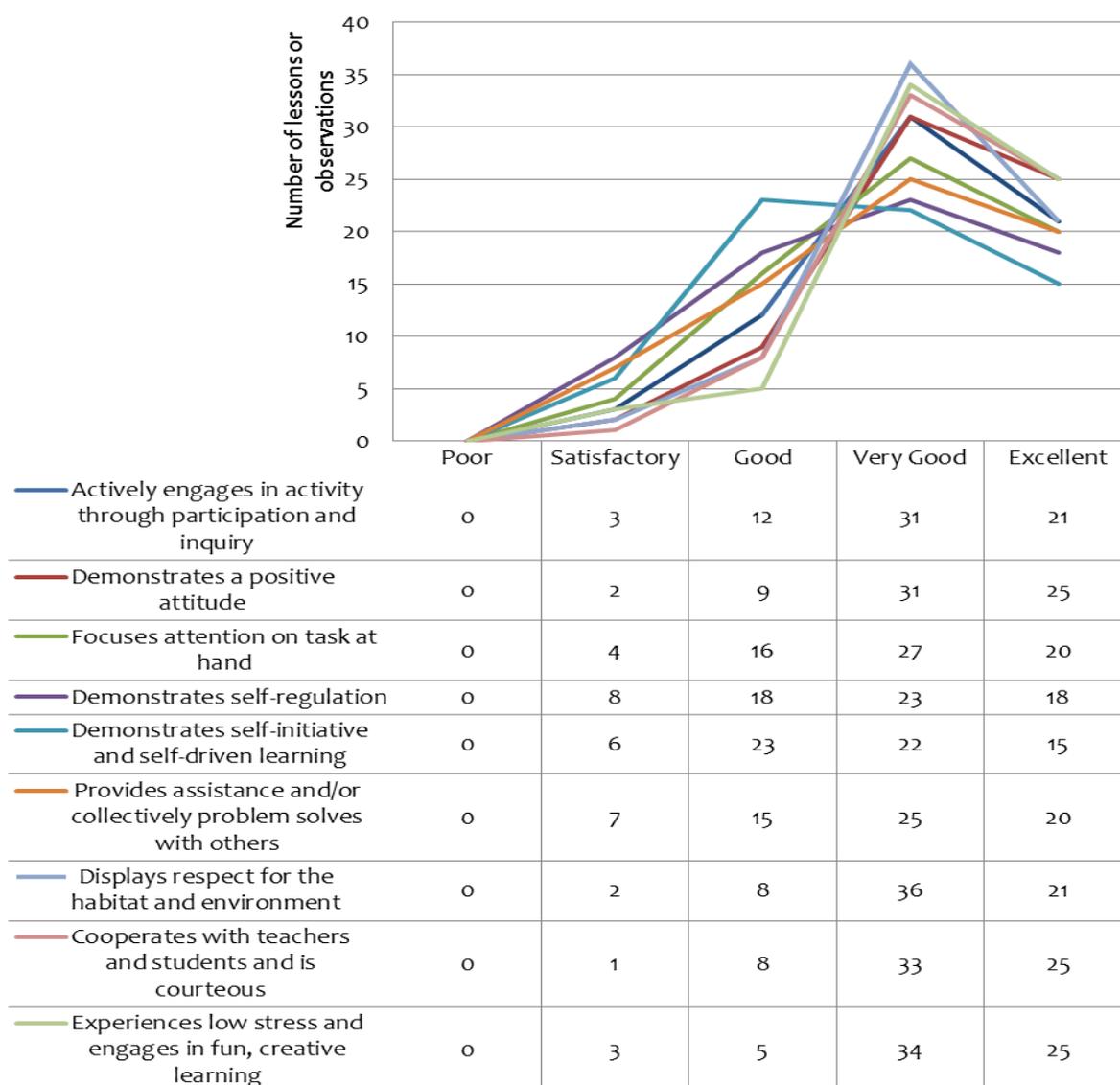
Overall, students appeared to be well behaved and engaged during outdoor science lessons and SYH building activities. Students’ social behaviors received ratings of *very good* or *excellent* across all social skills in a majority of lessons, and did not receive a rating of *poor* in any lesson. A relatively high percentage of students’ academic learning behaviors received *very good* or *excellent* ratings. The outdoor learning environment appeared to be conducive to students’ academic learning.

Figure 10. Teachers’ Ratings of Active Learning During Outdoor Lessons



Source. 2012 SYH Teacher Survey

Figure 11. Teachers' Ratings of Social Skills Exhibited During Outdoor Lessons



Source. 2012 SYH Teacher Survey

Teachers' General Perceptions of SYH and Its Potential for Teaching

Teachers were asked to consider a series of statements and then rate how likely it was that they felt the statement was true (on a 6-point scale, where 6 = *very likely to be true* and 1 = *very unlikely to be true*) (Figure 12). The first statement read, “My SchoolYard Habitat may be nice, but it doesn’t really improve student academic achievement.” To interpret teachers’ ratings of this item consistently with ratings of other items, it is important to keep in mind that the item was written negatively (“doesn’t really improve”). On this item and the item reading, “It is difficult to cover traditional curriculum content using the SYH,” the reader must recall that a rating of *unlikely to be true* is most desirable. The average rating teachers assigned to the first inverted statement was 2.8 (just below *somewhat unlikely*). That rating indicates that teachers felt somewhat uncertain that having an outdoor learning

habitat would boost students' academic achievement, but they left the possibility open. With regard to the second inverted statement, teachers gave an average rating of 3, or *somewhat unlikely*. That rating can be interpreted in tandem with their other comments about the need for additional training and the need to have the SYH lesson plans rewritten to mesh with existing state and local curricula. An average rating of 3 on a question for which the ideal response is 1 on a 6-point scale indicates the teachers felt the existing curriculum needs improvement.

Two points are important to note at this stage of the grant's conclusion: making changes to provide useable lessons that align with the standards and require little teacher modification could (a) improve teachers' confidence that the SYH learning environment can improve students' achievement, and (b) the existing curriculum standards can be easily addressed using the outdoor learning environment. Supporting this interpretation, and bringing optimism to the conversation, is the response teachers provided to another statement in this set: "Using the SYH helps students understand science concepts." Teachers assigned an average rating of 5 (an ideal rating is 6 for this item). This very high mark indicates that teachers who used the SYH to teach science believed strongly that it was a useful and effective means for teaching science concepts to their students. With the necessary curriculum adjustments, the academic impact may be much stronger.

Table 4 lists each statement regarding teachers' perceptions of the value of SYH for students' learning, and the average rating assigned to it on a 6-point scale. The highest and lowest ratings assigned for each item are listed to provide an estimate of the variation in ratings among teachers.

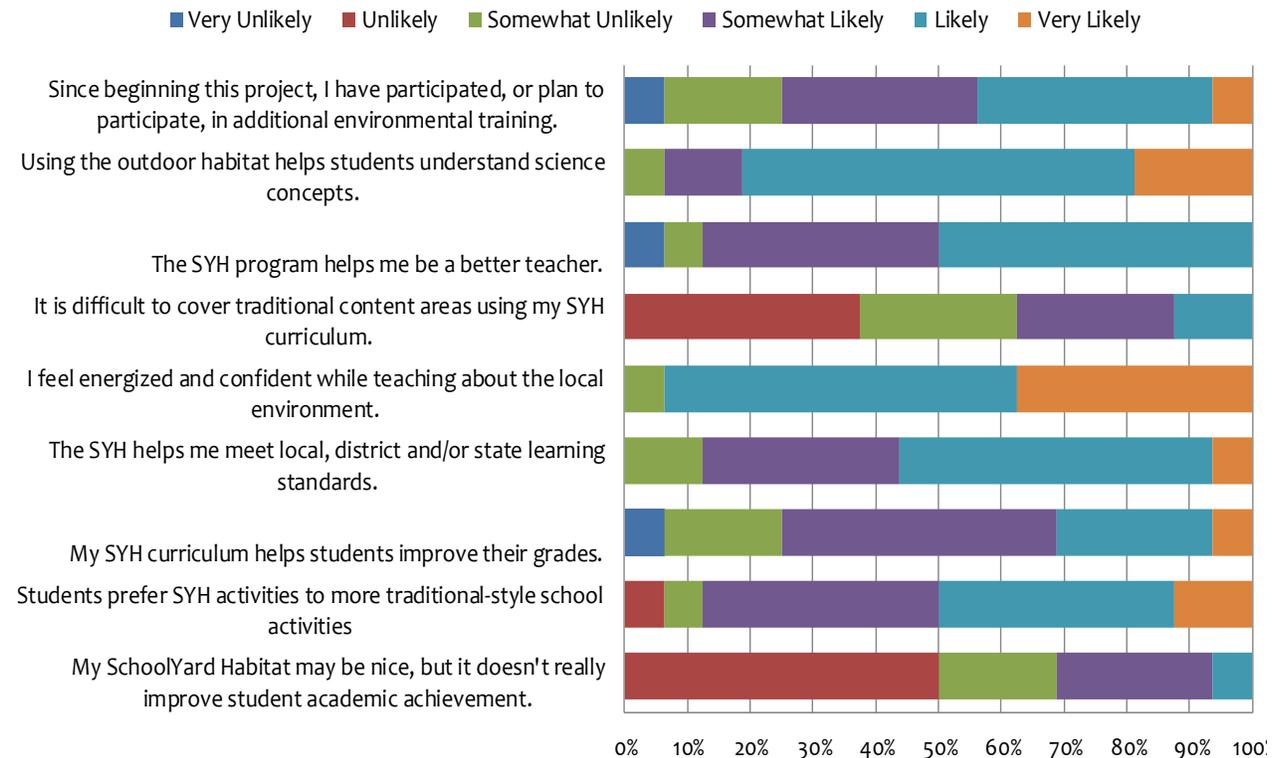
Table 6. Teachers' Ratings of Statements Regarding the Teaching Value of SchoolYard Habitat (SYH)

Statement	Mean	Range (low, high)
My SchoolYard Habitat is nice, but doesn't improve student academic achievement.	2.7	1,5
Students prefer SchoolYard Habitat activities to traditional school activities.	4.4	2,6
My SchoolYard Habitat curriculum helps students improve grades.	4.1	1,6
The SchoolYard Habitat helps me meet district and/or state learning standards.	4.6	3,6
I feel energized and confident teaching about the local environment.	5.3	3,6
It is difficult to cover traditional content areas using my SchoolYard Habitat curriculum.	3	1,5
The SchoolYard Habitat program helps me be a better teacher.	4.4	1,6
Using the SchoolYard Habitat helps students understand science concepts.	5	3,6
Since beginning the SchoolYard Habitat I have participated in additional environmental training NOT related to the National Wildlife Federation.	4.2	1,6

Source. 2012 SYH Teacher Survey.

Note. A 6-point scale was used where 6 = *very likely to be true* and 1 = *very unlikely to be true*.

Figure 12. Teachers’ Ratings of Statements Regarding the Value of SchoolYard Habitat (SYH) for Students’ Learning



Source. 2012 SYH Teacher Survey.

Note. A 6-point scale was used where 6 = very likely to be true and 1 = very unlikely to be true.

Teachers’ Self-Efficacy and the SYH Program

The extent to which a person believes he or she is capable of succeeding in something and has confidence in his or her activities as being of import and of value has an impact on that individual’s experience of success (Ashton & Webb, 1986; Bandura, 1977; Bandura, 1993; Bandura, 1995; Coladarsi, 1992; Denham & Michael, 1981). Teachers’ self-efficacy has been linked to many teaching activities. Three items in the series outlined in Table 5 were combined into a proxy estimate of teacher self-efficacy for the innovative and non-traditional approach to teaching science using outdoor classrooms. The items of interest were: “My SYH curriculum helps students learn science concepts,” “I feel energized and confident while teaching about the local environment,” and “The SYH program helps me be a better teacher.” The composite variable of *teacher self-efficacy* was then examined to see whether any correlation existed between the level of self-efficacy a teacher felt with regard to teaching in SYH and his or her perceptions of the program as a whole. Interestingly, a very strong positive correlation was found between a teacher’s general sense of self-efficacy about this program and how relevant the teacher felt the program was to his or her students’ learning ($p = .003, .691$). The latter item read, “The program is personally relevant to learners. In other words, the program addressed concerns and issues that made them personal or relevant to students’ lives.” The average rating for the whole set of teachers’ responses (on a 7-point scale, where 1 = lowest and 7 = highest agreement) was a 5.8, with a range of responses from 4 (neutral stance on the statement) to

a 7 (very high agreement). This finding suggests that the more confident and effective a teacher felt about teaching environmental issues outdoors, the more that teacher saw the SYH as a way to make environmental science concepts personal to students' lives. Likewise, as a teacher's self-efficacy decreased, the extent to which that teacher viewed the program as relevant to students' lives also decreased.

Another interesting finding related to teachers' self-efficacy in SYH was its impact on teachers' curriculum and lesson plan choices and the amount of habitat usage in general. Teachers who had a higher self-efficacy used the habitat more frequently than did teachers who felt less self-confidence and sense of effectiveness about the SYH. The ways teachers used SYHs with students also differed between teachers who had a higher or lower sense of self-efficacy about using SYHs. Teachers who had a lower self-efficacy used the habitats for non-academic activities more frequently than did teachers with a strong self-efficacy. Conversely, teachers with higher self-efficacy used the SYHs more for academic teaching. Within lessons, teachers with a higher self-efficacy used SYHs to engage in higher rates of soil, air, and water measurement or higher rates of collection and environmental policy study. On the other hand, teachers with lower self-efficacy tended toward lessons or activities related to environmental awareness and environmental restoration (e.g., tree planting).

A higher self-efficacy in teachers also meant differences in perceptions about how the program meshed with learning standards. Teachers with higher self-efficacy felt more strongly that the SYH program helped them meet the district's or state's learning standards than did those with lower self-efficacy. In fact, eight of the 10 teachers who had high self-efficacy rated the statement about learning standards using the highest two rating levels (i.e., assigned a 5 or a 6 on a 6-point scale of agreement). None of the teachers who had a lower self-efficacy used the level 6 rating option, and only two used level 5. Teachers who planned to use SYHs next year can be separated into those planning to use the habitat for activities and those planning to use it for academics. Teachers who planning to use it for activities had lower self-efficacy, and those planning to use it next year for both academic lessons and for activities had higher self-efficacy. In summary, teachers who felt more confident and effective using the SYH tended to (a) use it for more frequent academic lessons; (b) use it for lessons focused on soil, water, and air measurement and on issues of environmental policy; (c) use it for lessons that addressed the state's or district's curriculum standards; and (d) feel outdoor learning helps students learn science concepts.

The Future of Newly Established SYHs

According to teacher survey responses, on a scale of five (where 5 = greatest agreement and 1 = least agreement with the statement), most teachers planned to continue using SYHs during the next school year (Table 5). An average rating of 4.5 on the item probing their intent to use the SYH to teach academic content next year shows a relatively strong commitment by teachers to continue the SYH program after funding ends. Recall, as well, that one in four campuses has continued to develop and expand its SYH after completing the initial phase of grant-required activities. This demonstrates a commitment to continuing to develop the environmental education programs on these campuses that was triggered (almost solely) by the offer of funding to build SYHs. Additionally, many teachers completing the survey indicated they had, or intended to, receive additional training in

environmental education beyond that provided by the NWF. The intention to learn how to master outdoor teaching shows an ongoing commitment to outdoor education that was sparked through the work of the NWF to put SYHs on AISD campuses.

Table 7. Level of Teachers' Commitment to Using SchoolYard Habitat (SYH) After the Grant's Conclusion

Question	Responses	Mean
I plan to use our Outdoor Learning Habitat to teach academics next year.	14	4.5
I plan to use the Outdoor Learning Habitat for purposes OTHER THAN academic teaching next year.	15	3.87

Source. 2012 SYH Teacher Survey.

Recommendations for Future Program Considerations and Evaluations

The following recommendations for the continuation of the SYH program in the AISD resulted from the information in this report.

1. Expansion of the SYH curriculum options and collaboration with AISD's SHRC and Science Department are recommended. This will ensure the provision of class materials and equipment sharing that allow for more time-efficient preparation and material access, and that should encourage the depth and breadth of teacher use.
2. Establishment of a website that has a prominent link from the AISD Science Department (and appears in multiple places on the website) is recommended. This will enable teachers to access a SYH central hub of information, resources, lesson plans, FAQs, and additional sources of SYH funding. This website should provide planning and building as well as training resources to all teachers, including new teachers hired by campuses that house a SYH. It also can feature links back to appropriate parts of the AISD science curriculum page or out to other environmental education organization websites and to relevant NWF content.
3. A quasi-experimental study should be conducted to formally monitor SYH use, curriculum, and student outcomes. Special attention should be given to teachers' characteristics (e.g., planning time, lesson plans, and implementation) and students' characteristics (e.g., participation, behavior, and academic benefits).

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Additional Information About this Report

About the Department of Research and Evaluation. The Department of Research and Evaluation (DRE) was established in 1972 to support program decision and strategic planning in the district. The department is housed in the Office of Accountability and is charged with evaluating federal, state, and locally funded programs in AISD. DRE staff integrate best and innovative evaluation practices with educational and institutional knowledge. DRE staff work with program staff throughout the district to design and conduct formative and summative program evaluations. DRE's methods for evaluating programs vary depending on the research question, program design, and reporting requirements. The evaluations report objectively about program implementation and outcomes, and serve to inform program staff, decision makers, and planners in the district. DRE reports can be accessed online.

About the author. Dr. Laura T. Sanchez Fowler completed a Ph.D. in education at the University of North Texas in 1996. Her academic interests include factors affecting differential school performance trajectories in high-risk students. She has published more than 20 peer-reviewed and professional papers and book chapters. Laura rejoined the DRE team in December 2011.

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District strategic 5-year plan. This report speaks to goals 1, 2, and 4. **Goal 1:** All students will perform at or above grade level (on standardized tests). **Goal 2:** Achievement gaps among all groups of students will be eliminated. **Goal 4:** All schools will meet or exceed state accountability standards, and the district will meet federal standards and exceed the state standards.

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