Title: *The World is Our Big Backyard!*

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"The World is Our Big Backyard!" That's how 100 Kindergarten and Second Grade students learned about "that big science word: *Sustainability!*" They learned about Sustainability and caring for the environment in a standards-based integrated thematic unit on Sustainability conducted as part of the elementary school's ongoing primary curriculum.

In a conversation about Sustainability that the authors had with the students' classroom teachers, the teachers conceded that teaching about Sustainability to young children is very important. The teachers' concern, though, was that the tremendous emphasis in the school on teaching to the state/national academic standards in order to score well on standardized testing, left no time in the school-day to teach about Sustainability and care of the environment. Understanding that the demand of meeting the state/national academic standards and preparing students for standardized testing is the focus of contemporary educators, yet convinced that teaching about care for the environment and Sustainability must begin with young children, the authors designed a six-week integrated thematic unit on Sustainability that they taught to the Kindergarten and Second Grade students. With the Kindergarten and Second Grade teachers in attendance and participating with the hands-on instruction, the authors demonstrated how: 1) teaching about Sustainability, 2)

meeting the academic standards, and 3) preparing for standardized tests can be accomplished.

Sustainability, a contemporary term, describes the need to conserve the Earth's resources and to forestall global warming. It emerged in the school curriculum as 'environmental education,' 'global education,' or 'sustainable development education' (Wheeler & Byrne, 2003).

The message of Sustainability is, indeed, a pressing one, and one that becomes increasingly more critical to communicate to students. News reports of climate changes, dwindling natural resources, and governmental controls directed toward protecting the environment remind us almost daily of its urgency. In convincing detail, Dodd (2008) explained the tremendous impact the human population explosion is having upon the Earth's resources. He noted that the Earth's resources are finite and that the human population is overshooting the ability of the Earth to support us sustainably.

So, not only did the importance of teaching about Sustainability emerge from the authors' discussion with the teachers, but a second important piece – teaching the children how to live in the environment in a respectful and responsible way – also emerged. Therefore, the second basic message of Sustainability education, the authors contend, is to help students understand, appreciate, and take action in their role as stewards of the Earth's resources; that is, teachers must resolve to make students aware of their individual, personal, and daily responsibility to preserve the Earth's resources.

A starting point to understanding and appreciating the human role on the Earth is to help students see their interdependence with the Earth's other living species. Suzuki (2002), for example, describes quite directly and specifically the evolution of living species on Earth over billions of years. In clear ways understandable to non-biologists, Suzuki describes the four life-giving forces that support life: air, water, energy, and earth. He makes the point that the same air and water that sustains our life is the same air and water that sustained the lives of our ancestors. He describes both the energy that the sun gives us, and the life-giving nourishment the soil provides. The natural cycle of resources that Suzuki describes sustains life.

Another element to consider, then, is *life*, itself; that is, the cell, the basic element of life. In the process of his research with cells, Karl-Henrik Robert (1998) realized that all living species are unified, basically by the similarity in the makeup of their cells. This concept, that all living species are unified in existence and share the same cycle of natural resources, is a basic understanding that students need in order to appreciate the depth of human interrelatedness with all other forms of life.

We humans like to think of ourselves as the highest form of living species. Thinking in those terms, and acknowledging the commonality that we have with other life-forms and realizing that life as we know it only takes place in the atmosphere we call Earth, calls for us to be stewards of the Earth's natural resources and to be respectful of its natural cycles. As adult stewards of the Earth, it becomes imperative that we teach our children to become stewards of

the Earth, as well. This value which parents may begin to teach at home can, and should, be continued and supported by the school curriculum. Perhaps, conversely, the children, taught these values in schools, will take them home and teach them to their parents.

Normally, a school curriculum addresses Sustainability, as an end-of-year topic, a side issue, or offers it as an elective in high school (Munson, 1997). However, the basic assertion of this research is that an introduction to Sustainability needs to begin in the early and primary grades and continue throughout the students' schooling. In the many works of Paul Shepard (Lavery, 2009), Shepard notes that our home is the Earth and he describes our interconnectedness with other living species, especially animals. His work describes human development as an evolving dance with nature, suggesting that children's early experience with nature triggers an emotional bonding with the environment that affects the way they treat it as adults. Shepard's work supports the authors' view that guiding children in caring for and interacting with the environment should begin in preschool and be nurtured throughout the primary grades. It can, then, continue through the middle level grades and beyond, as is the current practice. Dodd (2008) would agree with this, as he stated that education from an early age and throughout adulthood is required to transmit information on protecting the global environment.

Introduction to the Project

In considering the design of the project, a review of professional literature affirmed the authors' belief that, first, Sustainability education can, and should, begin in the early and primary school curriculum. Secondly, they agreed with Dale and Newman (2005) and Higgs and McMillan (2006) who asserted that an instructional approach integrating the natural and social sciences would not only help students understand Sustainability concepts, but would also encourage them to incorporate sustainable activities into their daily behaviors. Third, they were supported by pedagogical literature that advocates the use of integrated thematic projects, units through hands-on and developmentally appropriate activities as best practices in early childhood education (Copple & Bredecamp, 2009). Finally, they were affirmed in planning their project in a local elementary school by Wangari Maathai's (Ahmad, 2005) argument that Sustainability education should be local and should aid in the social interactions in the community.

Therefore, in designing this project, the authors considered that:

a. Sustainability education is an urgent and worthy goal;

b. Sustainability education is viable for young children;

c. National and state standards guide the school curriculum; and

d. Standardized testing scores assess the school curriculum.

With these facts, the objectives for this project became:

a. Create an interdisciplinary standards-based unit on Sustainability for the Early Childhood curriculum;

b. Introduce Sustainability concepts to young children;

c. Provide training to teachers on Sustainability concepts;

d. Demonstrate how to integrate Sustainability concepts into the ongoing Early Childhood curriculum, and,

e. Demonstrate how to use an interdisciplinary theme on Sustainability to prepare for standardized testing.

The authors derived a working definition of Sustainability Education from Higgs & McMillan (2006): a curriculum

(a) that "helps students understand and respond to complex environmental, social, and economic issues in a way that promotes sustainable living",

(b) in which "methods are interdisciplinary, learner-centered, experiential, and based on real-life issues", and,

(c) "where educators hope that students will not only understand sustainability concepts, but also incorporate them into their behaviors."

Explanation of the Project

The authors created an interdisciplinary six-lesson thematic unit, "Sustainability in Our Big Backyard." Each lesson was (a) knowledge-based, (b) aligned with national content standards and Pennsylvania K-12 Academic Standards, and (c) had a hands-on reinforcing activity. The authors implemented the unit at an elementary school in Scranton, Pennsylvania, where 50 Kindergarten and 50 Second Grade students participated in 30-minute lessons each week.

The Lessons:

Each lesson began with 'Circle Time,' a teacher-directed lesson when Ladybug, a finger-puppet, introduced facts and vocabulary related to the lesson. Ladybug taught the children two songs, "Ladybugs" and "Sustainability," which the children sang throughout the six-week period.

After Circle Time, the students formed cooperative learning groups where a hands-on activity reinforced the focus of the lesson.

Following Group Time, students wrote personal reflections in their journals. Two questions guided the student reflections: "What did you learn in this lesson?" and "What will you do?" Students drew pictures on their journal sheets to illustrate the guiding questions. Kindergarten children dictated their responses to teachers; most Second Graders wrote their own responses. The classroom teachers later wrote responses to reflection questions.

Final Activity:

After the sixth lesson, families came to a final activity: a short program through which the students shared the work they did for the project. First, the children sang the songs that Ladybug had taught them, and each class read the poem the groups created during the Global Warming lesson. Next, the children individually shared their journals with their families. Finally, each child helped to plant a fledgling lilac tree in a high-visibility area of the schoolyard, symbolizing the school's commitment to include Sustainability Education in its school-wide curriculum.

Data Analysis

Data collected during the project were: (a) the children's weekly journal pages; (b) feedback from the classroom teachers; and, (c) photographs taken during each lesson. The authors reviewed the data as per qualitative research; that is, noting repetition of patterns.

Student Journals

The first pattern noted was the children's expressions of caring. The most common words were "take care of." The children wanted to "take care of" the trees, the plants, the Earth. In related terms, they wanted to "not hurt," "help," and "clean up." The phrase "take-care-of" was evident in response to both reflection questions: What did you learn? What will you do?

A second pattern that emerged was evidence of the learned vocabulary and knowledge goals (facts) for each lesson. Vocabulary words the students used included 'kernel, 'aphids,' and 'crown.' Facts that fascinated the children included 'earthworms have five hearts' and 'corn is grown around the world.'

A third pattern that emerged was the children's use of the terms "Sustainability" and "Our Big Backyard" revealing the children's belief that they could make a difference: sustaining the planet takes individual effort, and individual effort begins in our own backyard.

Classroom Teacher Journal Responses

The classroom teachers appeared quite impressed with the interdisciplinary Sustainability unit. Their comments indicated that they could now see how such a unit could work in their classrooms' ongoing curriculum,

noting that the facts and vocabulary could help in preparing students for the required standardized tests.

Meeting the Objectives

The authors compared the data to the objectives of the project.

#1: Create an interdisciplinary standards-based unit on Sustainability for the Early Childhood curriculum.

The authors created six lessons on Sustainability for this project; however, they contend that an interdisciplinary theme on Sustainability needs to be an ongoing part of the yearlong curriculum. A classroom teacher affirmed this when she wrote:

> *"My entire Science curriculum is based on teaching the students about taking care of our world and respect. I can fit this into my regular curriculum by reinforcing sustainability in our school environment (cleaning areas, recycling, respecting). The topics are very meaningful to the students and the world in which we live."*

#2: Introduce Sustainability concepts to young children.

Since Kindergarten is between Pre-Kindergarten and First Grade, and Second Grade is between First Grade and Third Grade, the authors implemented the project with Kindergarten and Second Grade students. With appropriate developmental considerations, a unit on Sustainability Education could be easily adapted across grade levels, PreK-3.

#3: Provide training to teachers on concepts related to Sustainability.

The Kindergarten and Second Grade classroom teachers participated fully in the project. They were present during Circle Time, and they facilitated the

reinforcing activity, interacting with students in the collaborative learning groups and assisting with journal writing as needed.

#4: Demonstrate how to integrate Sustainability concepts into the ongoing Early Childhood curriculum.

The reinforcing activity of each lesson provided the children with authentic practice in a content area skill. For example, during the Arbor Day lesson, children practiced the math skills of counting and measuring; during the Global-Warming lesson, children practiced the language arts skills of rhyming words and creating poetry; during the Corn lesson, children practiced mapping skills when discovering that corn is a staple food in many cultures around the world.

#5: Demonstrate how to use an interdisciplinary thematic unit on Sustainability in preparation for standardized testing.

Creating knowledge-based interdisciplinary themes is a known means for delivering an effective Early Childhood curriculum. The children were very enthusiastic about the unit on Sustainability! Providing children with interesting information about the world around them keeps them excited about learning. The facts in a knowledge-based interdisciplinary theme invite vocabulary development. This is a key ingredient to literacy and language development in Early Childhood! This expansion of facts and vocabulary provides children with a knowledge base that they can use when taking standardized tests.

Discussion

The success of this project was encouraging and reaffirming! The project met its objectives, and the participants provided valuable feedback, thus indicating that lessons on Sustainability are meaningful to children and important for inclusion in the Early Childhood curriculum.

The Kindergarten and Second Grade classroom teachers appeared very interested in the Sustainability Unit, and they showed this in a number of ways by:

(1) assisting as needed during each 30-minute lesson;

(2) allowing children to finish journal entries during class time throughout the following week;

(3) answering the children's questions and reading books to the children that were related to what the children learned in the Sustainability project, and,

(4) completing their journal entries with substantive feedback.

The ease with which the lessons could be connected to the existing curriculum amazed the teachers! Teachers commented on the importance of including Sustainability topics in the Early Childhood curriculum, noted that the lessons included many topics for future discussions, and shared their plans to continue the themes with extended lessons.

It is easy to implement Sustainability Education into the ongoing Early Childhood curriculum and make learning come alive. The topics motivate young children to care about the world around them and invite them to take actions in helping to make the world a cleaner and safer place in which to live.

The project's cooperative learning activities addressed the diverse learning styles among the children, allowing those who struggle in traditional settings to become more active and engaged learners. The hands-on and interactive lessons held the attention of children who had difficulty focusing.

In the brief period of the project, the children's journal writing provided evidence of a growth in language expression. As the weeks progressed, the children came to not only develop complete sentences to express their thoughts, but they also became more reflective in their responses regarding what they learned and what they would do.

It is impressive that at this young developmental level, the children were able to see a connection to their place in the world. The project expanded their sense of their 'big backyard' to a more global view, at the same time allowing for a synthesis of information and an application to their daily living.

The brief time structure of six 30-minute lessons could not address the numerous topics across the disciplines that could have been included in this Sustainability Unit. This affirms the importance of infusing a Sustainability theme into the yearlong curriculum. Little separate lessons are just not enough!

In months that followed completion of the six-week project, one author encountered students and teachers who had participated in the project. They told the author stories of how the corn kernels from the corn-planting lesson grew to become part of a family meal.

Conclusion

In reflecting upon the success of this Sustainability project, the authors offer thoughts for further research.

First, the 'greening' of the curriculum for young children needs to continue. The children in this project were avidly interested in learning about the world around them, and they were keenly interested in knowing how they can be caregivers of the Earth. The Kindergarten and Second Grade teachers who participated in this project clearly saw how they could: 1) easily incorporate Sustainability Education into the ongoing curriculum, 2) discover sustainability concepts across the content areas, yet 3) meet state standards and high-stakes testing regulations at the same time.

Second, the 'greening' of the Early Childhood curriculum lends itself to Multicultural Education. In this project, the lesson on Corn had a multicultural focus as the children learned that corn originated in Mexico and is now a staple food for differing cultures around the world. In a yearlong unit, the teacher could expand this concept to show that Sustainability and global warming is a worldwide issue. It affects all people and all cultures that call this Earth 'home.'

Third, the 'greening' of the Early Childhood curriculum lends itself to Character Education. The 'take care of' theme that emerged in this study clearly reflects the character traits of 'respect,' 'responsibility,' and 'caring.' Character traits are not foreign to young children. From infancy, children show empathy for and caring to others. Parents, as well as Early Care & Education caregivers, reinforce, lift, and extend these character traits daily. In this respect, the children,

themselves, show us the interconnectedness between ‘taking care of’ the Earth (sustainability) and ‘respect,’ ‘responsibility,’ and ‘caring’ (character).

Finally, with the concern for global warming and conserving Earth’s resources, the authors offer this project as evidence that Sustainability – ‘big science word’ – can, and should be taught to young children so they can see, and appreciate that The World is Our Big Backyard!

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