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Environmental Science in Middle School Curricula: A Pilot Project in  
the Dominican Republic

by

Laura Tejada

A Thesis Submitted in Partial Fulfillment of the  
Requirements for the Degree of Master of Science  
In Environmental Science

Gosnell School of Life Sciences  
College of Science

Rochester Institute of Technology  
Rochester, New York  
November 16, 2012

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## Table of Contents

Dedication.....	5
Acknowledgements.....	6
Abstract.....	7
Education for Sustainable Development and Sustainability .....	8
Importance of Education for Sustainable Development (ESD) to Improve Quality of Life.....	8
Importance of ESD to improve Quality of Life.....	9
The Need for Environmental Sciences (ES) and Sustainability Concepts in School.....	10
Reality of ESD, ES, and Sustainability Education in the Dominican Republic and the Challenges Ahead.....	11
Primary School Curricula of the Dominican Republic and ESD.....	13
Challenges of ESD in the Dominican Republic.....	15
Environmental Issues in the Dominican Republic.....	17
-Water Contamination.....	17
-Solid Waste Management.....	18
-Unsustainable Tourism.....	19
-Habitat Destruction, Erosion, and Biodiversity Loss.....	20
Purpose of the Research Project.....	21
Specific Objectives for 2011-2012.....	21
Methodology.....	23
-Site.....	23
-Activities.....	24
-Project Assessment and the Role of the Researcher.....	27
-Assessing Success in Achieving the Projects Objectives.....	28
-Interviews and Focus Groups.....	28
-Quantitative Analyses.....	29
Results: Quantitative Analyses.....	30
-5th Grade Project: Composting Quantitative Analysis.....	30
-6th Grade Project: School Garden Quantitative Analysis.....	36
-7th Grade Project: Garbage Project Quantitative Analysis.....	40
-8th Grade Project: Energy Audit Quantitative Analysis.....	46
Summary of Quantitative Results.....	51
Results: Qualitative Analyses.....	52
5th Grade: Composting Project.....	53
-Pre and Post Tests Qualitative Analysis.....	53
-Skype™ Focus Groups Interviews.....	54
6th Grade: The Garden Project.....	59
-Pre and Post Tests Qualitative Analysis.....	59
-Skype™ Focus Groups Interviews.....	61
7th Grade: The Garbage Project.....	66
-Pre and Post Tests Qualitative Analysis.....	66
-Skype™ Focus Groups Interviews.....	68
8th Grade: The Energy Audit Project.....	72
-Pre and Post Tests Qualitative Analysis.....	72
-Skype™ Focus Groups Interviews.....	75
Discussion: Quantitative Analyses.....	81
-Table 1: Participation Data Summary for all Projects .....	81
-5th Grade: Composting Project.....	82
-Table 2: Answer Summary of Pre & Post Tests (Yes & No).....	82

-6th Grade: School Garden Project.....	83
-Table 3: Answer Summary of Pre Tests (Yes & No).....	83
-7th Grade: Garbage Project.....	85
-Table 4: Answer Summary of Pre & Post Tests (Yes & No).....	85
-8th Grade: Energy Audit Project.....	86
-Table 5: Answer Summary of Pre & Post Tests (Yes & No).....	86
Discussion: Qualitative Analysis.....	88
-Green Culture at the Community for Learning.....	88
-The Garden Project: Community Building & Aldeas Infantiles.....	89
-Suggestions for the Future.....	90
-Lessons Learned.....	94
Conclusion.....	95
Future Research Opportunities.....	96
Appendix Section.....	97
Works Cited.....	199

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## **Abstract**

The Dominican Republic's (DR) public investment in education by 2010 was 2% of the GNP; falling behind the 6% minimum established by UNESCO in 2010 as a requirement to achieve quality education. The DR has not developed an Environmental Education policy. The DR's Environment Law 64-00 dictates Environmental Education to be introduced as one of the cross-cutting themes called "transverse axis" into the general curricula of all schools. However; due to lack of time and teachers able to integrate these axes into lesson plans, they were seldom implemented. This pilot project took place at The Community for Learning School (TCFL). Their 5th – 8th grade science curricula were enhanced with four activities (Composting, School Garden, Garbage Project and Energy Audit) designed to connect with current themes in the school year 2011-2012. Assessing students' knowledge gain with pre and post-tests data, assessing changes in attitude towards the activities and assessing changes in behavior post implementation were the evaluations used. In the quantitative analyses, codified data helped built 95% Confidence Intervals, Chi-Square tests of association, clustered bar-graphs and Non-parametric (Mann-Whitney) tests for small samples. For the qualitative analyses, students, staff and teachers were interviewed through focus groups. The school garden and the composting project improved students' motivation towards group work and left a positive perception of these environmentally friendly practices. Positive change in attitude was perceived among the participants; however, the knowledge gain about the environmental benefits of both activities was not as expected. Throughout the focus group sessions, an increase in environmental awareness was recorded for all activities to some degree. However; for the garbage project and the energy audit, only minor behavioral and attitude changes were perceived. Overall, all activities were considered positive for the school and the grade levels. Teachers, staff and students agreed that they should be continued.



## **Education for Sustainable Development and Sustainability**

### ***Importance of Education for Sustainable Development (ESD) to Improve Quality of Life***

Quality education is considered a key ingredient in the recipe for any nation's development (ECLAC, 2010). The Universal Declaration of Human Rights states in article 26 that everyone has the right to education and that it should be free at least in the elementary or fundamental stages (UN, 1948). The declaration of human rights was signed 62 years ago and education remains today a global topic of interest. The United Nations (UN), working in conjunction with other important international entities developed, in the year 2000, The Millennium Development Goals (MDG's). These goals are a representation of the basic human needs and fundamental rights that every human being is entitled to enjoy (UNESCO, 2010).

One of the MDG's set by the UN in the year 2000, was to "achieve universal primary education". A key factor to take into account when planning changes in the education agenda of a country is its budget. Budget allocations should envision the proper remuneration for well-prepared teachers in any education system. For developing countries this is a delicate matter, since every other sector in its economy seems to be in need of a large piece of the national budget. Overall, in Latin America by the year 2007, the percentage of GNP allocated to the education sector was 4.1%. This percentage still falls behind the limit required to achieve quality education for all, which is 6% of the GNP (UNESCO, 2010). In the particular case of the Dominican Republic, quality of education requires attention, due to the fact that public investment in the education sector by the year 2010 was barely 2% of the GNP (UN, 2010). In many other developing countries the same situation takes place. The number of issues to address at a national level, along with insufficient institutional capacity, and poorly developed political processes, impair governments from taking action to fulfill citizen priorities, such as education (UNESCO, 2000).

### *Importance of ESD to improve Quality of Life*

The UN declared the years 2005 until 2014 the decade of Education for Sustainable Development (ESD). The purpose of this declaration was to encourage nations to address issues such as poverty, violence, inequity, and depletion of natural resources. In the Latin American region the majority of the progress concerns the elaboration of national environmental education policies; however in the Caribbean region this level of “institutional integration” hasn’t been accomplished (UNESCO, 2010).

UNESCO, in the World Youth Conference in 2010, stated the importance of ESD in the region of Latin American and the Caribbean, declaring it a “necessary tool to improve quality of life”. Education can represent an inflection point in the shift towards a more environmentally aware and sustainable society. In order to serve this purpose, education must be able to assist in a “transformational” process that will prepare individuals willing and able to help build a sustainable society (Sarkissian et al, 2009). As members of society, youth, and children, should be prepared and instructed to understand the environmental problems in their community. They must be taught to act in such a way that their actions will assist; in whatever way possible, in the efforts to support sustainable practices. Youth around the world should be motivated to organize and gather together to “use their creativity and audacity; characteristic of the age, as a way to try to ensure sustainable development” (UN, August 1992). Even though some progress has been reported in terms of an increase in the percentage of children enrolled in primary school (UN, 2010), in order for students at all levels of the education ladder to obtain quality education, the curriculum needs to be delivered by prepared and motivated teachers.

In order to achieve quality universal primary education, industrialized and developing countries must pay particular attention to their education systems, budgets, and agendas. Easy access to new information and teaching materials should be readily available for teachers in order to provide quality education. Every country’s education agenda should promote policies and programs that encourage the professional development of its teachers. This professional development should contemplate the different realities of the respective countries and new scientific findings, while remaining in context with the local culture. At the same time, these programs should instruct teachers on how to address local issues by making connections to

similar situations in different parts of the world. This could help to channel best practices and to use the education process as a tool for problem solving.

### **The Need for Environmental Sciences (ES) and Sustainability Concepts in School**

In order for education to fulfill its purpose of enhancing human qualities and providing the platform for personal and professional development, “education needs to be relevant and pertinent” (UNESCO, 2010). Because of the many environmental issues the world is currently facing, educating towards sustainability could be considered both, a relevant and pertinent goal for any nation’s education system. However, the struggle to eradicate poverty in developing countries of the world oftentimes prevents governments from dedicating the attention and budget allocations that both education and environmental programs require.

Some of the causes for the existing poverty rates in developing countries include poor agricultural development, missing or underdeveloped infrastructure, tropical diseases and climate change (McArthur Foundation, 2008). In order for environmental education in developing countries to be appropriate and fit the needs of a specific community, it needs to take into account the previously mentioned factors that cause poverty, while simultaneously addressing targeted environmental issues within the same community. Raising the level of education in a nation’s population can have a positive impact in its development process. There are tangible links between higher levels of education and better job opportunities, as well as poverty reduction and health improvements (UNESCO, 2010).

Environmental problems come in a wide variety of forms and degrees of impact. Different communities will have different sets of issues regarding the environment, and will also have many different ways to approach them. Education is one of the options to address environmental issues and try to achieve sustainable development. In the Dominican culture there’s a popular saying that states: “Every teacher has their own book”; and this refers to the way different people approach, process, and share information. This applies when addressing ESD as well. Flexibility in the curricula, and tailored activities designed to meet the specific needs of a given locality, are clearly needed (Sarkissian et al, 2009). There is a vast amount of

resources and materials which address the need for sustainable development. There is also a large amount of curricular material and detailed procedures for educators interested in addressing ESD (Huckle and Sterling, 1996).

Different types of education systems require different approaches. Formal and informal approaches to education will address ESD differently. This does not imply that any of the processes will be more efficient or better than the other. Both formal and informal education systems present opportunities to address a wide range of environmental issues at a different scale. Each one of these approaches to education should allow and promote citizen participation in different social circles to express concerns, share ideas, and work to reach a common goal.

Learning about sustainable practices and environmental issues at a young age can help to build a lifelong community of environmental learners. This learners' community later on would help with the propagation of information, and environmentally friendly practices among a community. The result will be an increase in the efforts towards eradicating environmental issues in developing countries, such as the Dominican Republic.

### **Reality of ESD, ES, and Sustainability Education in the Dominican Republic and the Challenges Ahead**

As a developing country, the Dominican Republic meets all the criteria established by UNESCO for countries that have not achieved many of the MDG. A more specific example is the fact that the Dominican Republic is among the nations in the Caribbean region that currently have not developed a formal environmental education policy. However, in an attempt to address ESD the government of the Dominican Republic<sup>1</sup> created, in the year 2004, a division within the Ministry of Environment and Natural Resources. The Environmental Education and Information division was created; with the purpose to manage, develop, and implement the formal and informal educational processes and projects in environmental education (Ministerio Ambiente, 2011).

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<sup>1</sup> Governmental period 2004-2012 presided by Leonel Fernandez

A different approach towards achieving ESD was taken by the Ministry of Education (ME) in April, 2003. In its Plan Ampliado para la Educación (Broadened Educational Plan), the ME discusses the plans and projects that would take place in the education sector in the time period comprising the years 2003 until 2012 (Ministerio de Educación, 2003). This plan mentions, as a project in progress at the time, the implementation of environmental education as a “transverse axis” in primary schools, secondary schools, and schools for teachers. According to the plan, this project was also expected to coordinate actions that would promote the development and implementation of activities that would link schools and communities. The major goal of these activities was to assist in the protection and improvement of local environmental conditions. All of this was to be accomplished with the help of the German Agency of Technical Cooperation (former GTZ now GIZ), in Santo Domingo (Plan Ampliado de Educación, 2003). However, the details of the activities that were being implemented or developed are not mentioned in the plan. Contact with the GIZ revealed that this institution only helped during the initial years and all the documentation about the project was kept by the ME (Mena - Tamayo, 2011). None of the materials from the project have been made available to the public through the ME’s website.

According to information from the Department of Environmental Education within the Ministry of Environment there was a national environmental education strategy developed in the year 2004 (Edward, 2011). However, this national strategy was not published nor implemented and it is currently undergoing revision to be launched formally by the year 2012. The Dominican Environment Law 64-00 states that the Ministries of Education and Environment together are responsible for both formal and informal environmental education programs. The reality is that both entities have developed programs separately, neither of them at a national scale. This law also declares that environmental education would be introduced as a “transverse axis” into the curricula of all school types and modalities of education (formal and informal).

The majority of the environmental education programs and activities planned by the Ministry of Environment happen upon request by the person or institution that need them, and depend on the available budget. The only program that runs on a yearly basis is the

reforestation program with high school seniors. In order to graduate high school students are required to perform sixty hours of community service; thirty hours can be achieved by completing the Ministry of Environment's program. This program includes information session and a trip to replant a deforested area of the country (Checo, 2011). However, it is not required that all schools and students participate in this program, since there are others ways to accomplish the sixty hour community service requirement.

The lack of coordination among these important governmental institutions such as the Ministry of Environment and Ministry of Education makes the development and implementation of a nationwide environmental education strategy difficult.

### ***Primary School Curricula of the Dominican Republic and ESD***

The primary school curricula of the Dominican Republic has been subject to constant revisions and changes, most of them brought by political changes in the directive positions of the Ministry of Education. This inconsistency in the administration is reflected in the many attempts to implement changes in the primary school curricula. The changes indirectly affect the progress of the attempts to make environmental science and sustainability concepts permanent in the curricula.

In the Broadened Education Plan 2003-2012 concepts of environmental science and sustainability were initially introduced in a section of the curricula called transverse axes or "Ejes Transversales", also known as cross-cutting themes. The transverse axes are considered broad topics meant to integrate aspects of life, behavior, and technology to all subjects and courses in school (Editorial Santillana, 2000). There are seven transverse axes in total:

1. Contexto Social y Natural (Social and Natural Context)
2. Cultura Dominicana. Identidad y Diversidad (Dominican Culture, Identity and Diversity)
3. La Democracia y Participación Ciudadana (Democracy and Citizen Participation)
4. Ciencia y Tecnología (Science and Technology)
5. Trabajo y Desarrollo Social (Work and Social Development)

6. Educación para la Salud (Health Education)
7. Creatividad y Desarrollo de los Talentos (Creativity and Development of Human Talents)

Any of these transverse axes can be approached through any of the general subjects such as Math and Language Arts. Environmental education would fall under the Science and Technology transverse axes. This makes it difficult for classroom teachers to include it in their lesson plans more regularly.

The idea behind this approach was to avoid making environmental science an extra subject to be added in the curricula, because this would require more funding in terms of curricular development, as well as teacher preparation. At the same time it would be interconnected with subjects other than science (Guerrero, 2011). The problem with this particular approach was that due to lack of time and lack of prepared teachers able to integrate the transverse axes into their daily lesson plans, these axes were seldom implemented in the classrooms.

In the year 2008, the ME launched its 2008 -2018 Decennial Plan of Education (Plan Decenal de Educación). This new education plan focuses on “the development of life skills as a way to prepare students for insertion into full citizenship and the job market (Ministerio de Educación, 2010). One of the main goals of the current education plan is to update the primary school curricula that had been developed in 1995. In this document, each grade level has an assigned set of indicators of the capacities that the students should acquire at the end of the grade; however, environmental science concepts are still approached through the transverse axes strategy.

The Dominican Law of Education states in its 6<sup>th</sup> article: “Education should encourage in the population a consciousness of protection and rational use of natural resources, as well as the defense of environmental quality and ecological balance”. No Dominican curricula yet have managed to address this matter with rigor, and governmental institutions have not been able to ensure its achievement at either a national or regional level.

## **Challenges of ESD in the Dominican Republic**

ESD faces many challenges in the Dominican Republic; the lack of prepared teachers is among the most important ones. In a study surveying teachers in Latin America it is acknowledged that many of teachers in the public system come from low income rural families, with them being the first generation of professionals in the family lineage (Mejia et al, 2006). In fact, the same study revealed that the economic situation of teachers in the Dominican public education system is economically precarious, often only making enough to roughly maintain the household.

Another reality of the educators in the Dominican Republic is the fact that monthly wages are low, which forces them to seek other employment to supplement their income from teaching (Mejia et al, 2006; Smith, 1992). This leaves them little time for continuing their education. In this same study Mejia et al, (2006) stated that the education plans and the proposed didactic materials are often outdated and not in tune with the teaching environment. This makes effort towards ESD and education for sustainability seem disconnected from reality.

Smith (1999) explains in Figure 1 the vicious cycle between poverty and the effects it has on the education systems. It addresses the reasons for the lack of prepared teachers, blaming it on the poor remuneration and insufficient budget allocation from the governments. These factors make teaching an occupation, rather than a profession for young teachers that seek better paying jobs. This lack of prepared teachers results in poorly prepared students that will join society and the job market, with many gaps and deficiencies in their education.



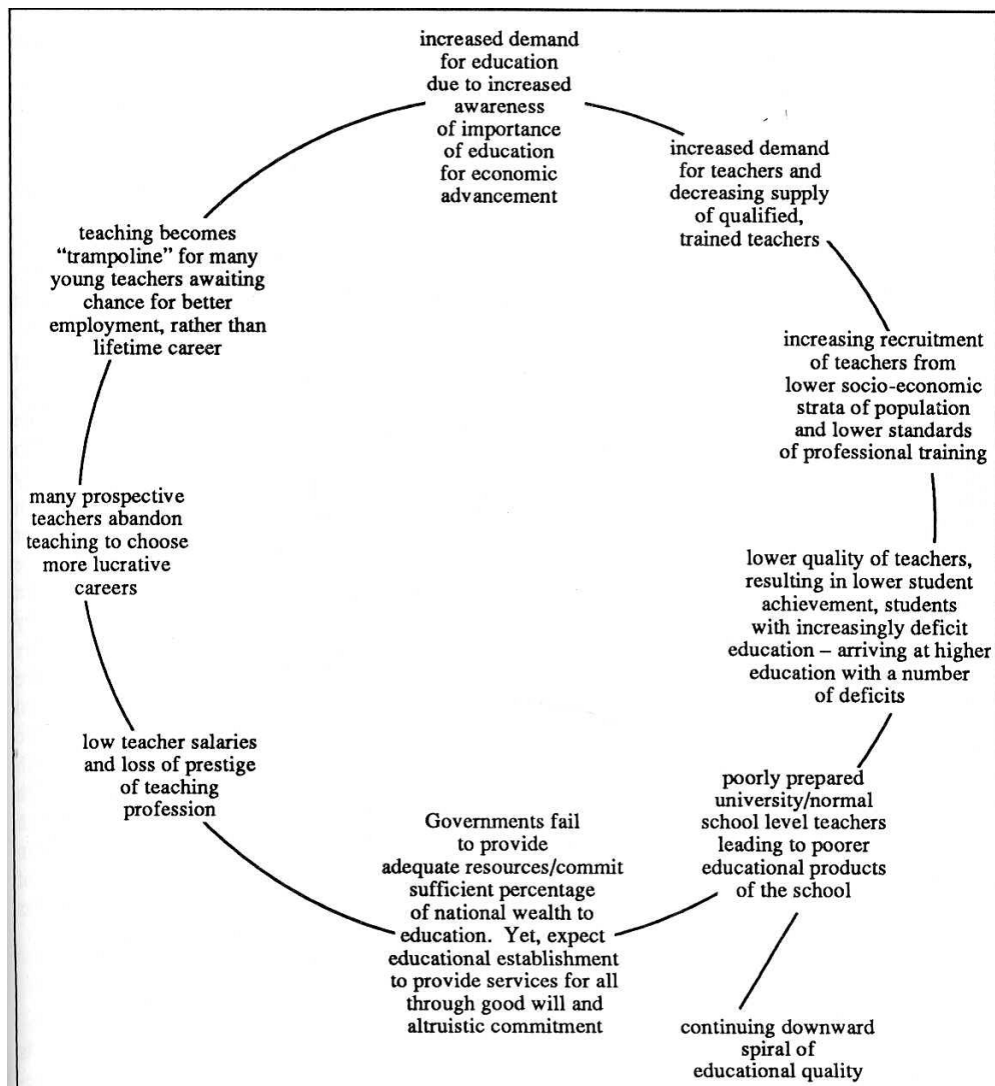


Figure 1: Educational Cycle of Poverty in the Dominican Republic (Smith, 1999). This diagram explains the vicious cycle among poverty and its effects on the education process.

It has become clear that poverty is a key challenge for ESD in the Dominican Republic, not only from the teacher's perspectives, but also from the perspective of the students. Children who have to work to bring in money to the household do not attend school regularly and often fall into delinquency. An unpublished qualitative study performed by the Dominican anthropologist Tahira Vargas with poor youth from various low income neighborhoods, revealed that many of them fall into delinquency attracted by the appealing sums of money resulting from illicit activities (Vargas, unpublished).

Another challenge posed to ESD in the Dominican Republic is the lack of up to date information on the web space of key government agencies. In the case of the ministry of environment the department of education services' website information hasn't been updated since the year 2008. Furthermore, the information available in the website is generic and the same for all of their services, asking the public to contact by phone or email detailing their request. In the case of the Ministry of Education their website is often updated; however there is no direct or indirect link to access the environmental education programs they currently offer, or have implemented in the past. Not having information about environmental education programs accessible can make people remain uninterested and unaware of local environmental problems, and their possible solutions.

## **Environmental Issues in the Dominican Republic**

### ***Water Contamination***

La Hispaniola is the island of the Caribbean shared by the Dominican Republic and Haiti. Because of its island nature, La Hispaniola has a limited supply of freshwater. This is reflected in the frequent suspensions of the water supply to the households of some of the most populated cities like Santo Domingo. Because of the scarceness of this natural resource it is imperative that a national plan for conservation be implemented.

It is also necessary to expand the current waste water treatment program. According to a report from the Ministry of Environment only 10.7 % of all the Dominican households were connected to drains that lead to waste water treatment plants by the year 2001 (CORAASAN, 2001). The remaining 89.3% of the households have septic tanks, or their drainage goes straight into open sea or large rivers such as the Ozama (Villalvilla, 2011). This volume of raw sewage being disposed of in natural water bodies significantly impacts the marine, riverine and estuarial ecosystems, at the same time decreasing the quality of the water that washes up in beaches and shores.

### ***Solid Waste Management***

The increase in recent years of solid waste production has significantly stressed natural systems in small-island developing states such as the Dominican Republic (UN, 2010). This degradation of the natural systems is mostly because the limits of our carrying capacity have been exceeded due to social and economic growth. One important fact to mention about the composition of the solid waste is that in many of the small island states described by the UN over 50% of the total waste is organic. In the specific case of the city of Santo Domingo the organic fraction of the waste accounts for 53.4% of the total waste produced (Ayuntamiento del Distrito Nacional, 2007). This highlights the potential and need for composting programs.

The increase in solid waste production related to the steady increment in population growth can stress many types of ecosystems. In fact, the result of current waste management practices in small island states, has contributed to the degradation of shoreline and mangrove ecosystems. It has also contributed to the propagation of vectors and diseases, as well as increased the probabilities of food source contamination (UN, 2010) through the drainage of decomposed fluids and chemicals to water bodies.

The Dominican norm that regulates the management and disposal of municipal solid waste, states in section 6.1.6. that “no one is to dispose of waste, or allow anyone to do the same in public spaces such as streets, roads, sidewalks or any other place than the ones designated by the city” (Ministerio Ambiente, 2003). However, the reality is one completely different in which the waste collection schedules of the city are no match for the amount of waste produced. Therefore most of the appointed places to collect solid waste are generally full, and people leave bags of waste around them, without any type of regulation. This increases the chances of spreading diseases through the proliferation of vectors, at the same time decreasing the aesthetic value of public spaces, and clogging the storm water drainage creating serious floods in highly populated areas.



Figure 2: Workers unclogging storm water drainage systems in Santo Domingo, at Ciudad Universitaria, July, 2011.

### *Unsustainable Tourism*

Because of the many miles of beaches that surround the Dominican Republic tourism is currently one of the most important sources of income. However, according to a publication by the Inter-American Development Bank this sector lost competitiveness and this is attributed in part to the environmental degradation of our littoral landscape due to urban sprawl, and the presence of solid waste (Villalvilla, 2011).

According to the author David Weaver (Weaver, 2001) the modality of tourism most practiced in the Dominican Republic falls under the category “Unsustainable Mass Tourism”. This type of tourism according to Weaver occurs where there is a large scale development with only a minimum of environmental regulation. The best examples of this type of tourism are cruise ships and all inclusive beach resorts. The amount of waste produced and the high traffic of people; both consequences of unsustainable mass tourism, can severely degrade and contaminate many natural systems ultimately leading to loss of environmental quality and species diversity.

### *Habitat Destruction, Erosion, and Biodiversity Loss*

Rapid population growth along with poverty is a devastating combination for the natural environment of small developing countries. Independently, either of these factors can speed up habitat degradation and destruction processes that can lead to loss of biodiversity and erosion. The Caribbean region has been identified as one of the 25 biodiversity hotspots for conservation in the world, because of the large number of endemic species found, as well as the increasing habitat loss it has experienced (Myers et al, 2000).

A study performed in La Cordillera Central, which is the birthplace of the largest and most important river in the DR, el Yaque del Norte, and many of its tributaries revealed that this region was undergoing severe deforestation by the mid 80's due to farming practices, and rapid deforestation rates, related to population pressure (Sambrook et al, 1999). This northern region is home to one of the DR national parks, Parque Nacional J. Armando Bermudez, and the largest peak in the Caribbean, Duarte's Peak. This and many other protected areas are subject to deforestation and degradation due to population pressures. Such is the case of the Jaragua National Park. This southwestern locality is protected by law and is home to many endemic species of flora and fauna. However, because it is close to the border with Haiti and is close to a very poor community in the southwest of the country, it is vulnerable to habitat fragmentation by conversion to farm land.

Although improvements have been reported regarding the rate of biodiversity loss (UNEP, 2002), the DR still needs to develop stronger policies and plans that ensure the continuation of the progress achieved so far. Increased national budget allocations towards conservation projects and efforts are necessary if the progress is to continue.

### **Purpose of the Research Project**

The overall purpose of this project was to develop, implement, and assess the effects of a set of activities that would introduce environmental science and sustainability concepts in the middle school curricula of the Dominican Republic. This attempt to integrate environmental science and sustainability concepts into the middle school curricula of the Dominican Republic is the first of its kind. The activities were implemented as part of a pilot project at The Community for Learning (TCFL), a bilingual school in Santo Domingo (<http://www.tcflearning.edu.do/>). This pilot project was conceived as a way to address the challenges to environmental science and sustainability education in the Dominican Republic previously discussed in the introduction section.

In general, the activities developed were connected, by way of TCFL's curricula, with the reality of some of the environmental and social issues in the Dominican Republic using the same strategy as the transverse axes. These activities were also designed to connect with the community in which the school is located. The participants in the project tried to accomplish all of this, while interconnecting the activities to one of the subjects, or themes, in the existing curricula. This avoided adding Environmental Science as an extra subject, while trying to maintain the workload of teachers and students at the same level. Only one activity was developed per grade (5<sup>th</sup>-8<sup>th</sup>), during the initial stage of the project for the school year (2011-2012).

### **Specific Objectives for 2011-2012**

- To develop and implement a set of hands-on activities for the middle school grade level (5<sup>th</sup> - 8<sup>th</sup> grade) that will help The Community for Learning (TCFL) continue on the path of becoming a sustainable and more environmentally friendly school.
- To connect the activities to the subjects or topics in the current school curricula. This will avoid adding extra workload to students and teachers.
- To implement a pilot project that may be used as a model in other schools. This could be achieved by revising the general curricula of other schools and connecting environmental science, sustainability concepts, and activities to it.

- To assess students' knowledge about the environmental issue that the activities address, and at the same time, to evaluate the impact of the activities in the overall school environment: staff, teachers, parents, and the community. This will be accomplished through the use of pre and posttests, teacher interviews, and student focus groups.
- To assess any possible changes in the students' attitude or perception, or demonstrated changes in behavior or conduct after the environmentally friendly practices covered in the activities. This will also be accomplished through the use of pre and posttests and through student focus groups instrument and sessions.

## **Methodology**

### ***Site***

The implementation of this pilot project took place at The Community for Learning School (TCFL) in the city of Santo Domingo Norte, Dominican Republic. The Community for Learning is a private school with above average resources both economically and in terms of teacher training, it also has a high population of students from high income families. This school is located among a mixed community of different incomes. There is a very wealthy population group as well as a very poor community all mixing together in the same locality of Carretera La Isabela in the municipal sector of Arroyo Manzano. The TCFL is a bilingual private school that encourages critical thinking, creativity, and hands on activities in their curricula. They encourage their student body to become “independent and cooperative learners” through the use of many different and original teaching strategies and diverse curricula.

The project was implemented first in the Community for Learning because they had the material and human resources to support it. Teachers are well trained and required no additional money or investment of time. Also, the classes were the ideal size for the implementation of the activities being proposed. The Community for Learning School offered the ideal conditions for the project implementation and assessment. TCFL was also chosen because it is a bilingual school and students are used to working and studying in English. This was an advantage because the majority of the reference and didactic materials used for the activities were in English.

The reality of the majority of private schools in the DR is that the class groups are too large (30 - 40+ students per group) to be handled by a single researcher. Another challenge to implementing this project in other private schools was that the logistics would require modification since projectors, laptops and wireless internet access are not always available for every class. In the public school system often times there is a lack of computer labs with internet access. But there are other issues to consider regarding the student population. Many students live in poverty and even extreme poverty conditions. Others miss school often because they work to bring money to their household. These factors make it difficult for them to focus



in class. Some of these factors can be removed from the panorama by trying the activities at public schools that participate in the breakfast program, and with a high population of families who use the solidarity card. The solidarity card program holds parents accountable if they send their children to work while on the program, because they receive economic assistance with the commitment to send their children to school.

A similar situation applies for teachers, since they would have also required extra training to be able to teach some of the activities. The didactic materials would have had to be translated and the activities would have had to be redesigned to fit this specific teacher-student population.

### *Activities*

To start the conceptualization stage of the activities, the general science curricula of TCFL for the grade levels 5<sup>th</sup> – 8<sup>th</sup> was evaluated to ensure that the new activities fit with the topics or themes presently taught at each level. This process took into consideration the opinions and ideas of TCFL's head of the science department, Gabriela Flaquer, as well as the school's principals, Carla Meyrink and Tami Haverly. The time period for the implementation and assessment of the activities was decided to be the 2011-2012 school year, which began in September 2011.

The TCFL class groups do not exceed 25 students per classroom, and generally there are two class groups per grade level, except 8<sup>th</sup> grade which was only one group at the moment. The activities were implemented by the two class groups of each grade, involving an approximate total of 124 students. Seven science teachers, with the assistance of volunteering parents and other staff from the school, oversaw the projects. Making parents aware of the goals of the activities and keeping them informed of the progress was a vital part of the project. We had hoped this would ensure the cooperation and willing participation of each student. We also hoped it would help to transmit the new concepts and their importance to the parents, and if possible to the larger community.

**8<sup>th</sup> grade: School Energy Audit:** This activity was proposed by the school administration and the head of the science department. The general objective of this activity was to identify the overall energy consumption of the school per month during the school year. This activity was designed to look at the electricity bill generated by the school every month while school was in session. The number of gallons of fuel consumed by the backup generator per month was also to be measured. This was important because the generator is used extensively during long, planned power outages in the particular community in which the school is located. These power outages result from the instability in the electricity supply. After assessing the energy consumption, students and teacher together developed ideas to reduce the energy consumption in the school. This activity was connected with the electricity and energy unit in this grade level.

A set of instructions for teachers of the different stages of this activity can be found in Appendix 5.

**7<sup>th</sup> grade: Expansion of the “Garbage Project”:** This project was first put into practice in the school year 2009-2010 by a former science teacher of the TCFL, Laura Tejada, as a way to observe one of the effects of overpopulation, while studying human population dynamics. During this assignment some parents had strong feelings over the idea of their children coming in contact with their household’s waste. Even though no hard data was kept from this initial year the average amount of waste produced per class was high enough for this activity to be repeated and try to start reducing waste production.

In the continuation of this project, students weighed and made observations of all the garbage produced in their household for 7 days, using a spring scale balance and gloves to look at the contents. Students had to record how many plastic, glass, and metal containers their household disposed each day. Also, students had to observe, record, and annotate what was in the contents of the organic part of the trash. They also had to record the total number of pounds the household produced per day. Using these data students, with the help of their teacher, would determine the total amount of trash produced in pounds per group per week, and the average per day. The teacher would start a database, as a way to track changes from year to year. As the final part of this assignment, students had to write a report explaining what they

learned from the project, and the importance of reducing the production of waste. In this written assignment, students also had to comment on what strategies they would use to achieve the reduction of waste. These strategies included reusing, reducing, and recycling of specific contents in their trash.

A set of instructions for teachers of the different stages of this activity can be found in Appendices 3 & 4.

**6<sup>th</sup> grade: Community Garden:** A Community Garden was developed on the school property. The garden was to be managed by the students, with the help and of their science teacher. In this garden, students grew different kinds of vegetables, which initially they would offer to the impoverished surrounding community at very low prices. The prices were to be set to just make enough money so that the garden would be sustainable for the next growing season. This garden was developed integrating ideas from Cornell University's Garden Project and other materials. The school committee proposed building roof top gardens, ground gardens, and hydroponics, using available, unused space areas of the school to teach about different forms of agriculture.

A set of instructions for teachers of the different stages of the garden can be found in Appendix 2.

**5<sup>th</sup> grade: Composting:** This activity was to be implemented as a means to provide organic fertilizer for the school garden in the 6<sup>th</sup> grade (see above). The organic part of the school waste was to be composted. At the beginning stage of this activity, students created a campaign to educate the rest of the school population on how to properly dispose of the organic part of the waste. This necessitated the collection, in separate bins, of the organic and non-biodegradable wastes so that it could be properly disposed. Cornell University's website for composting, along with the EPA and Michigan State's website were reviewed to develop the didactic materials for teachers. The ultimate decision on the type of composting strategy was discussed and determined by consensus with the science department, and administration. This activity was linked to the science theme Rocks and Minerals which talks about mineral and nutrient cycling in the soil. This provided an opportunity to show students how composting can improve the

quality of the soil by assisting the mineral and nutrient cycling made possible by many different living organisms present in the soil.

A set of instructions for teachers of the different stages of this activity can be found in Appendix 1

Timelines for each activity are included in Appendix 15

### ***Project Assessment and the Role of the Researcher***

There were three primary objectives of this research project. The first objective was to assess the students' knowledge gained through the implementation of the activities. This objective was accomplished primarily by analyzing the data gathered by the pre and post-tests. These tests were used to assess knowledge gain because we understood students would feel more comfortable answering in written form, than orally through an interview.

The second objective of this research project was to assess any possible changes in the students attitude or perception of the environmentally friendly practices covered in the activities (e.g. composting, reduce, reuse, recycle, sustainable gardening, and energy audits).

The third objective of the project was to assess whether or not the implementation of the activities resulted in changes in student behavior or conduct regarding the same activities or practices. The last two objectives were assessed through the focus groups instruments and sessions.

The role of the researcher was to develop the assessment instruments and moderate the focus groups sessions during the data collection process. This process required the assistance of Gabriela Flaquer in order to coordinate the best time for the students to have these sessions during school hours. Further, the researcher analyzed the data collected.

Table of assessment tasks and responsibilities can be found in Appendix 14

### *Assessing Success in Achieving the Projects Objectives*

The researcher made pre and post-test comparisons to note and report the knowledge gain about the environmental issues addressed by the projects. The format, questions, and content of both tests were similar in order for the data to be comparable. The focus group data was compared with the pre and post-tests data collected in the questions concerning the students' attitude and behavior, to note and report the differences from before and after the activities.

### *Interviews and Focus Groups*

At the end of these activities, interviewing teachers and school staff in general was the method used to assess knowledge relating to this project. In the case of the students, they were tested before the beginning of each activity to see how much they knew about the concepts and how open they were to the activities. By design, students should not have been given background information about the topic because we wanted to measure how much knowledge they had on the subject beforehand. The teacher in charge of administering them was to inform the students that the pretests were not graded, and that there were no right or wrong answers. At the end of the activities, there was a post-test to evaluate the knowledge gained and their openness to continuing or replicating the activities at home.

Pre-tests are found in Appendices 10 -13.

In order to facilitate and make interviews a less demanding process for the students and the interviewer, focus groups were the research qualitative method used to collect detailed data about the students' perception about the activities. In designing the instruments for the data collection, Krueger's (1998) methodology to develop focus groups questions was used.

According to Krueger (1998) there are five types of questions to be included in the final instrument: opening, introductory, transition, key, and ending. He states that the average length of a focus group is around two hours of questions; however this is aimed towards adult groups. In our specific case 45 to 60 minutes of questions and answers suit better a group of preteens and teens. The optimal number of participants is between five to seven individuals. We wished

to limit the number of participants per group to five, however, due to time constraints we allowed for groups of six or seven students. Krueger (1998) suggested that focus groups are to be repeated until no new information is obtained. However, because the sample size was limited we performed focus groups until we had gathered information from all of the participating students with parental consent documents.

In the case of teachers, they were asked to evaluate and provide feedback for the activities lesson plans that were provided in the beginning of the school year workshops. Their feedback was considered and modifications were made to the original documents proposed. At the end of the activities, teachers were interviewed on a one-on-one basis, while staff members were interviewed through focus groups. The interview instrument addressed their perceptions about the results, the students' knowledge gained through the implementation, and tried to assess their perception of whether or not the activities managed to change their attitude towards environmentally friendly practices.

Post-tests can be found in Appendices 16-19

The interviews and assessment documents for students, staff members, and teachers can be found in Appendices 20-25

### *Quantitative Analyses*

Because we could not obtain parental consent for all of the participating student population, as we originally had hoped, we were not able to account for the entire student population. As a result of this we decided to include a quantitative analysis section. With the data collected in the pre and post – tests, we codified the answers into numeric values in order to perform different statistical tests and build graphs. The tests performed allowed us to make educated comparisons between the knowledge gained by the students. At the same time, the tests allowed us to make more accurate conclusions about the entire student population.

## **Results: Quantitative Analyses**

### ***5<sup>th</sup> Grade Project: Composting Quantitative Analysis***

The first part of the quantitative analysis of this project used codified qualitative data collected from the Skype focus groups. These focus groups were composed of the student population whose parents gave consent to participate in the project. The quantitative analysis was performed using the software Minitab™.

-A table with the codified data from all focus groups is available in Appendix 35

Only 22 out of a total of 36 students (approximately 61% of the total 5<sup>th</sup> grade student population) had consent from parents. Because we didn't have access to the total 5<sup>th</sup> grade student population, as we had initially planned, we decided to build a confidence interval to assess the results of one of the key questions in the focus group instrument. For the Composting project we wanted to assess the proportion of students that had been motivated by the project to change the way they felt about working with solid waste and composting.

In order to properly assess the responses to this question, we first have to mention and acknowledge the possibility of response bias in the sample, since the students whose parents didn't give consent to participate weren't taken into account.

### **Building a 95% Confidence Interval around a proportion**

During the first year of the composting project 82% (18/22) of the students reported having had a positive change of mind about the way they perceived garbage and composting. We built a 95% confidence interval around this proportion to produce a plausible range of values in which the true population proportion of 5<sup>th</sup> grade students that reported had a positive change of mind about working with solid waste and composting is located.

The confidence interval for a proportion is built by taking the proportion observed in the sample and then adding and subtracting a margin of error. The margin of error for the 95% confidence interval is equal to approximately 2 standard deviations.

### Test and CI for One Proportion

Test of  $p = 0.82$  vs  $p \text{ not} = 0.82$

Sample	X	N	Sample p	95% CI	Z-Value	P-Value
1	18	22	0.818182	(0.657013, 0.979350)	-0.02	0.982

Using the normal approximation.

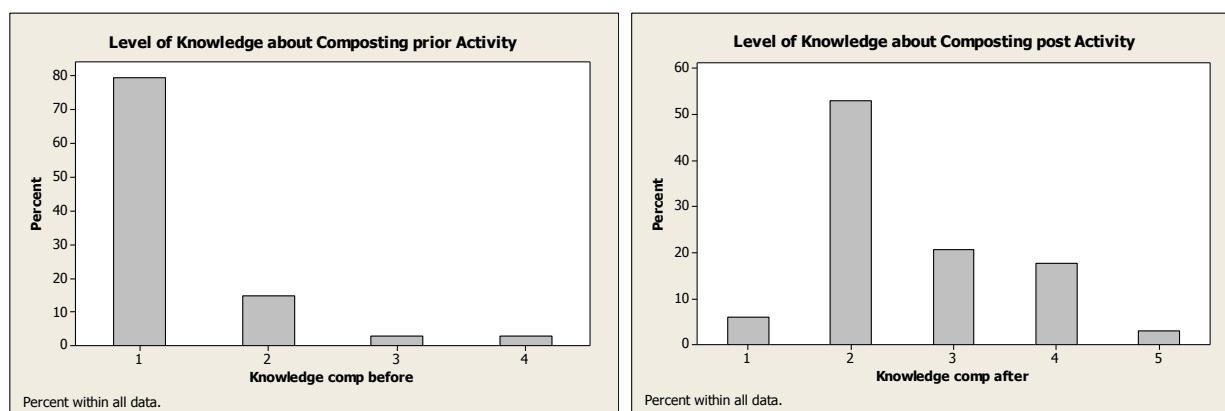
The 95% Confidence Interval for the proportion is (0.66 to 0.98), therefore, we are 95% confident that the true population proportion of the participating 5<sup>th</sup> grade students who had a positive change of mind about working with solid waste and composting as a result of participating in the project is between 66% and 98%. This confidence interval suggests that a proportion of at least 66% of the 5<sup>th</sup> grade students participating had changed their minds and viewed solid waste and composting in a more positive matter.

### Graphs and interpretation

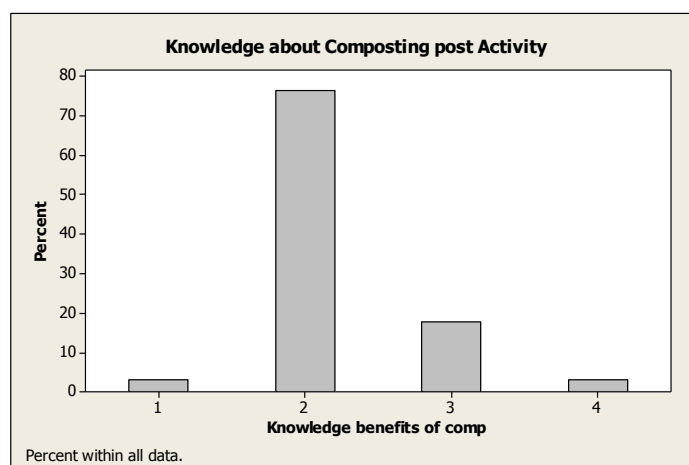
#### **Knowledge about Composting before and after the Composting Project**

The levels of knowledge about composting were measured by assigning a number to the response given by the student in both the pre and post-tests. The scale that was used ranged from 1-5 as follows, 1: very poor knowledge, if there was no answer provided or the answer provided no accurate information to the question; 2: poor, if the answer was too simple for the grade level and had errors about the concepts asked; 3: average, if the answer was sufficient for the grade level and contained no errors about the concepts asked; 4: good, if the answer provided was sufficient with examples or ideas to complement it; and 5: great if the answer was above the grade level expectation.





In the bar graphs above are displayed the levels of knowledge about composting before (left) and after (right). From these graphs we can observe that before the composting activity took place, participating students provided a higher proportion of answers in the 1 (very poor) and 2 (poor) categories. No participants provided answers in category number 5 (great) before the activity causing Minitab™ to drop the category in this graph. In the after graph we can see a decrease in the responses in category 1, and also an increase in the proportion of answers in the higher categories (3-5).



### **Knowledge about the Benefits of Composting for the Environment after the Activity**

Using the same scale as in the previous graphs it appears from the graph after the composting activity took place, the students provided very high proportion of category 2 answers (poor). This graph may imply that the composting activity was not successful at showing the students the possible environmental benefits of composting.

## Chi – Square Tests of Association

The third part of the quantitative analysis also used codified data from pre and post tests administered to the 5<sup>th</sup> grade students. The objective of these tests of association was to reveal if there was any relation between the student’s gender and the Yes/No responses to any of the questions.

### 1<sup>st</sup> Test of Association

Ho: Gender and response to the question “Have you heard about composting before?” are not associated (there is no relationship between the variables)

Ha: Gender and response to the question “Have you heard about composting before?” are associated (there is a relationship between the variables)

$\alpha=0.05$ , Test Statistic  $X^2=2.380$ , Df= 1

**P-value: 0.123**

Tabulated statistics: Gender, Heard comp before?			
Rows: Gender	Columns: Heard comp before?		
	No	Yes	All
F	12	7	19
	13.97	5.03	19.00
	0.2780	0.7721	*
M	13	2	15
	11.03	3.97	15.00
	0.3521	0.9780	*
All	25	9	34
	25.00	9.00	34.00
	*	*	*
Cell Contents:	Count		
	Expected count		
	Contribution to Chi-square		
Pearson Chi-Square = 2.380, DF = 1, P-Value = 0.123			

With a P-value of 0.123 which is greater than our alpha (0.05) we failed to reject the null hypothesis and concluded that there is insufficient evidence at the 5% level of significance to

support the claim that there is a relationship between the variables gender and the response the students gave to the question “Have you heard about composting before?” prior to the activity.

## 2<sup>nd</sup> Test of Association

Ho: Gender and response to the question “Would you be willing to try composting at home?” before the activity are not associated (there is no relationship between the variables)

Ha: Gender and response to the question “Would you be willing to try composting at home?” before the activity are associated (there is a relationship between the variables)

$\alpha=0.05$ , Test Statistic  $X^2=0.679$ , Df= 1

**P-value: 0.410**

Tabulated statistics: Gender, Willing try @home b4?			
Rows: Gender		Columns: Willing try @home b4?	
	No	Yes	All
F	1	18	19
	1.68	17.32	19.00
	0.27296	0.02642	*
M	2	13	15
	1.32	13.68	15.00
	0.34575	0.03346	*
All	3	31	34
	3.00	31.00	34.00
	*	*	*
Cell Contents:	Count		
	Expected count		
	Contribution to Chi-square		
Pearson Chi-Square = 0.679, DF = 1, P-Value = 0.410			

With a P-value of 0.410 which is greater than our alpha (0.05) we failed to reject the null hypothesis and concluded that there is insufficient evidence at the 5% level of significance to support the claim that there is a relationship between the variables gender and the response the students gave to the question “Would you be willing to try composting at home?” before the activity.

### *Test of Knowledge Gain through the Composting Activity*

The last part of this quantitative analysis consisted of a test to see if the students showed knowledge gain after the activity. For this purpose we ran a 1 Sample T test in Minitab™, using the difference between the coded values given to the answers provided by the students in the pre and post-tests. We focused only on the question “what is composting?” and the quality of the answer that each student provided. We created the difference by subtracting the coded value of the answer after the composting project, minus the coded value of the answer before the project.

$\mu$ = difference between the answers provided by the students to the question “what is composting?” (after minus before)

**H<sub>0</sub>:**  $\mu=0$  (no knowledge gain)

**H<sub>a</sub>:**  $\mu>0$  (knowledge gained)

$\alpha=0.05$ , Test statistic  $t= 9.45$ ,  $P =$  very small

#### **One-Sample T: Diff A-B**

Test of  $\mu = 0$  vs  $> 0$

Variable	N	Mean	StDev	SE Mean	95% Lower Bound	T	P
Diff A-B	34	1.294	0.799	0.137	1.062	9.45	0.000

Because the lower bound of the 95% confidence interval is 1.062, which is greater than zero, this confirms that there was knowledge gained through the composting activity.

### *Difference in Knowledge Gain by Gender*

After confirming that there was knowledge gain through the composting activity we wanted to check if there was a difference in knowledge gain by gender. Since our samples for both female and male students were less than 30 in number, and the normality tests were not passed by either sample we used a nonparametric test (Mann-Whitney) to see if there was a statistically significant difference between the knowledge gained by female and male students.

### Mann-Whitney Test and CI: Diff A-B\_F, Diff A-B\_M

	N	Median
Diff A-B_F	19	1.0000
Diff A-B_M	15	1.0000

Point estimate for ETA1-ETA2 is 1.0000  
 95.2 Percent CI for ETA1-ETA2 is (-0.0000,1.0002)

The first quantity Diff A-B\_F is Eta1, it represents the female students' difference in knowledge gain; the second quantity Diff A-B\_M is Eta2, which represents the male students' difference in knowledge gain. Since the confidence interval for Eta1 – Eta2 contains all positive values (0.000, 1.002) this implies that Eta1 is greater than Eta2. Statistically, this suggests that the population of female students tends to have more knowledge gain than the population of male students; due to the fact that the median difference (knowledge gain) for female students is significantly higher than that for males.

### 6<sup>th</sup> Grade Project: School Garden Quantitative Analysis

The first part of the quantitative analysis of this project used codified qualitative data collected from the Skype focus. These focus groups were composed of the student population whose parents gave consent to participate in the project. The quantitative analysis was performed using the software Minitab™.

Only 23 out of a total of 33 students (approximately 70% of the total 6<sup>th</sup> grade student population) had consent from parents. Because we didn't have access to the total 6<sup>th</sup> grade student population, as we had initially planned, we decided to build a confidence interval to assess the results of one of the key questions in the focus group instrument. For the School Garden project we wanted to assess the proportion of students that had been motivated by the project to start growing something at home.

In order to properly assess the responses to this question, we first have to mention and acknowledge the possibility of response bias in the sample, since the students whose parents didn't give consent to participate weren't taken into account.

## Building a 95% Confidence Interval around a proportion

During the first year of the school garden 39% (9/23) of the students had attempted to grow something at home. We built a 95% confidence interval around this proportion to produce a plausible range of values in which the true population proportion of 6<sup>th</sup> grade students that have started to grow something at home is located.

The confidence interval for a proportion is built by taking the proportion observed in the sample and then adding and subtracting a margin of error. The margin of error for the 95% confidence interval is equal to approximately 2 standard deviations.

### Test and CI for One Proportion

Test of  $p = 0.39$  vs  $p \text{ not} = 0.39$

Sample	X	N	Sample p	95% CI	Z-Value	P-Value
1	9	23	0.391304	(0.191851, 0.590758)	0.01	0.990

Using the normal approximation.

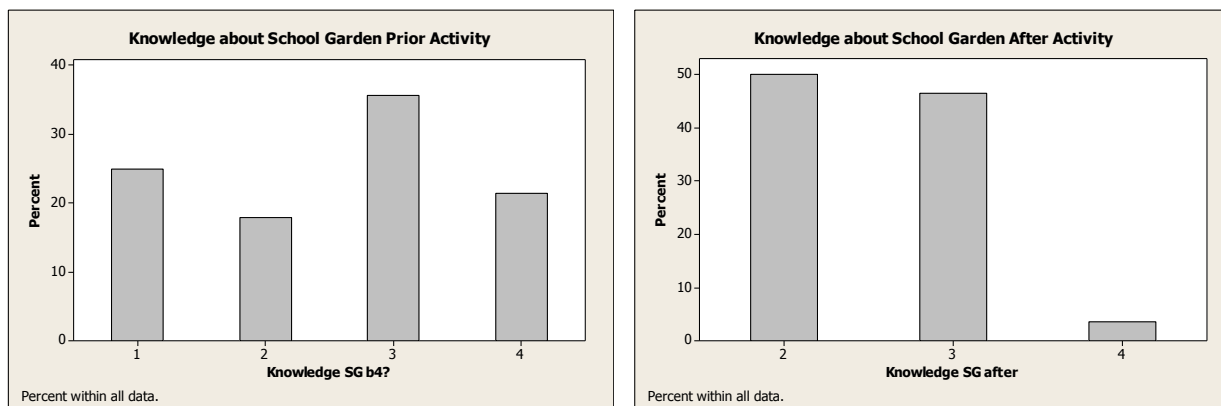
The 95% Confidence Interval for the proportion is (0.19, 0.59), therefore, we are 95% confident that the true population proportion of the participating 6<sup>th</sup> grade students that have started to grow something at home as a result of participating in the project is between 19% and 50%. Even though this confidence interval is rather broad it suggests that a proportion of at least 19% of the 6<sup>th</sup> grade students were motivated to start growing some produce at home.

## Graphs and interpretation

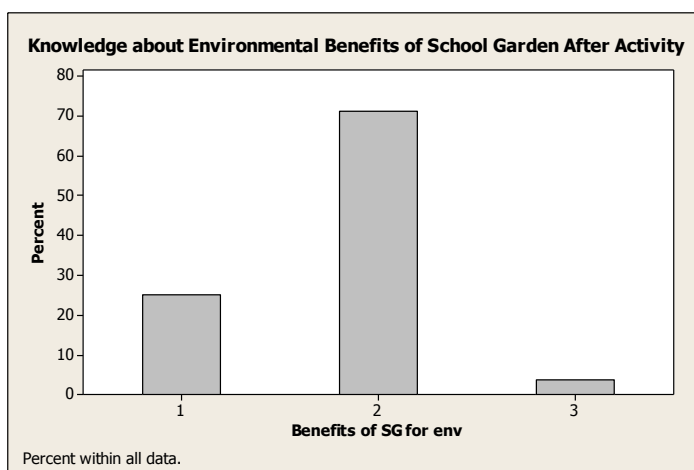
### Knowledge about a School Garden before and after the School Garden Project

The levels of knowledge about what a school garden was were measured by assigning a number to the response given by the student in both the pre and port-tests. The scale that was used ranged from 1-5 as follows, 1: very poor knowledge, if there was no answer provided or the answer provided no accurate information to the question; 2: poor, if the answer was too simple for the grade level and had errors about the concepts asked; 3: average, if the answer was

sufficient for the grade level and contained no errors about the concepts asked; 4: good, if the answer provided was sufficient with examples or ideas to complement it; and 5: great if the answer was above the grade level expectation.



In the bar graphs above are displayed the levels of knowledge about what is a school garden before (left) and after (right). From these graphs we can observe that before the school garden project began the highest level of knowledge was category 3 (average) answers. None of the participating students provided categories 1 and 5 (poor or great) answers after the activity; therefore categories 1 and 5 were dropped by Minitab™ in the after graph. However, from the after graph (right) we can observe that the percent of responses in the 4<sup>th</sup> category (good) after the implementation of the school garden seem to have decreased. Also, from the after graph we can observe a clear increase in the percentage of responses in the 2<sup>nd</sup> category (poor).



### **Knowledge of the Benefits of Having a School Garden for the Environment**

Using the same scale as in the previous graphs we can observe from the graph that participating students provided more responses in the 1<sup>st</sup> and 2<sup>nd</sup> categories (very poor - poor). In fact, none of the students provided answers in a category higher than average, hence the missing bars on categories 4 and 5 (good – great). We can also see from the graph that less than 10% of the students provided average responses.

### **Chi – Square Tests of Association**

The next part of the quantitative analysis also used codified data from pre and post tests administered to the 6<sup>th</sup> grade students. The objective of these tests of association was to reveal if there was any relation between the student’s gender and the Yes/No responses to any of the questions. However, because the data set was very limited this test did not render viable results.

### ***Test of Difference in Knowledge Gain through the School Garden Activity***

The next part of this quantitative analysis consisted of a test to see if the students showed knowledge gain after the activity. For this purpose we ran a 1 Sample T test in Minitab™, using the difference between the coded values given to the answers provided by the students in the pre and post-tests. We focused on the question “What is a School garden?” and the quality of the answer that each student provided. We created the difference by subtracting the coded value of the answer after the school garden project, minus the coded value of the answer before the project. However, because of the small sample size our normality test failed, making this test unsuitable.

### ***Difference in Knowledge Gain by Gender***

For the last part of the quantitative analysis we wanted to check if there was a difference in knowledge gain by gender. Since our samples for both female and male students were less than 30 in number, and the normality tests were not passed by either sample we used a nonparametric test (Mann-Whitney) to see if there was a statistically significant difference between the knowledge gained by female and male students.



### Mann-Whitney Test and CI: Diff A-B\_F, Diff A-B\_M

	N	Median
Diff A-B_F	11	-1.000
Diff A-B_M	17	0.000

Point estimate for ETA1-ETA2 is -0.000  
 95.2 Percent CI for ETA1-ETA2 is (-1.000,1.000)

The first quantity Diff A-B\_F is Eta1, it represents the female students' difference in knowledge gain; the second quantity Diff A-B\_M is Eta2, which represents the male students' difference in knowledge gain. Since the confidence interval for Eta1 – Eta2 ranges from negatives and positive values, therefore, including the zero value in it (-1.000, 1.000) this may imply that Eta2 is greater than Eta1. But this may also suggest that there may be no statistical difference in knowledge gain in males or females because zero is contained inside the confidence interval. If the difference between the two samples is zero, then the two samples may have been the same. This makes the results of this test unreliable.

### 7<sup>th</sup> Grade Project: Garbage Project Quantitative Analysis

The first part of the quantitative analysis of this project used codified qualitative data collected from the Skype focus groups. These focus groups were composed of the student population whose parents gave consent to participate in the project. The quantitative analysis was performed using the software Minitab™.

Only 11 out of a total of 32 students (approximately 34% of the total 7<sup>th</sup> grade student population) had consent from parents. Because we didn't have access to the total 7<sup>th</sup> grade student population, as we had initially planned, we decided to build a confidence interval to assess the results of one of the key questions in the focus group instrument. For the Garbage project we wanted to assess the proportion of students that had been motivated by the project to change the way they disposed of their garbage.

In order to properly assess the responses to this question, we first have to mention and acknowledge the possibility of response bias in the sample, since the students whose parents didn't give consent to participate weren't taken into account.

### **Building a 95% Confidence Interval around a Proportion**

During the first year of the garbage project 82% (9/11) of the students reported to have changed the way they and/or their families dispose of solid waste or garbage. We built a 95% confidence interval around this proportion to produce a plausible range of values in which the true population proportion of 7<sup>th</sup> grade students, that reported to have changed the way they and/or their families dispose of solid waste or garbage is located.

The confidence interval for a proportion is built by taking the proportion observed in the sample and then adding and subtracting a margin of error. The margin of error for the 95% confidence interval is equal to approximately 2 standard deviations.

#### **Test and CI for One Proportion**

Test of  $p = 0.82$  vs  $p \text{ not} = 0.82$

Sample	X	N	Sample p	95% CI	Z-Value	P-Value
1	9	11	0.818182	(0.590255, 1.000000)	-0.02	0.987

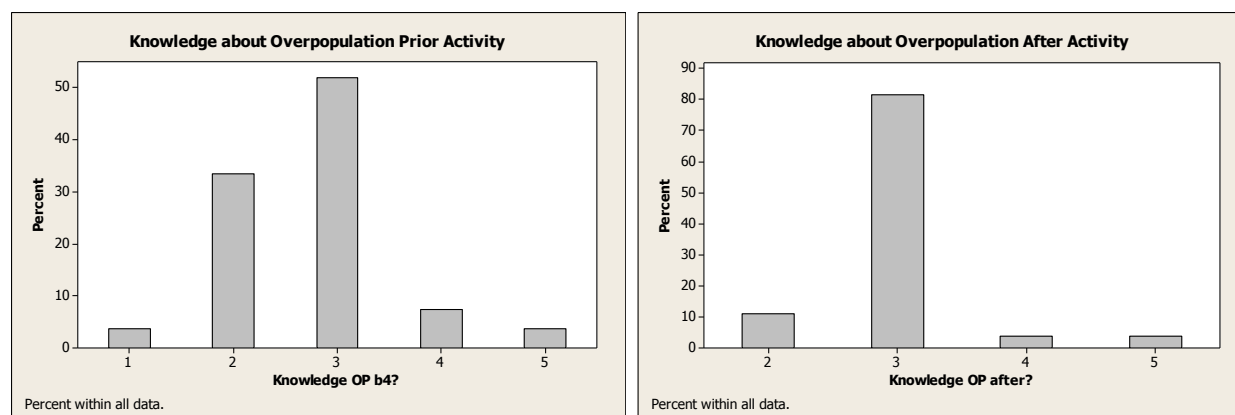
Using the normal approximation.

The 95% Confidence Interval for the proportion is (0.59 to 1.0), therefore, we are 95% confident that the true population proportion of the 7<sup>th</sup> grade students that reported to having changed the way they and/or their families dispose of solid waste or garbage as a result of participating in the Garbage project is between 59% and 100%. This confidence interval suggests that a proportion of at least 59% of the 7<sup>th</sup> grade students had changed the way they and/or their families disposed of solid waste or garbage after participating in the activity.

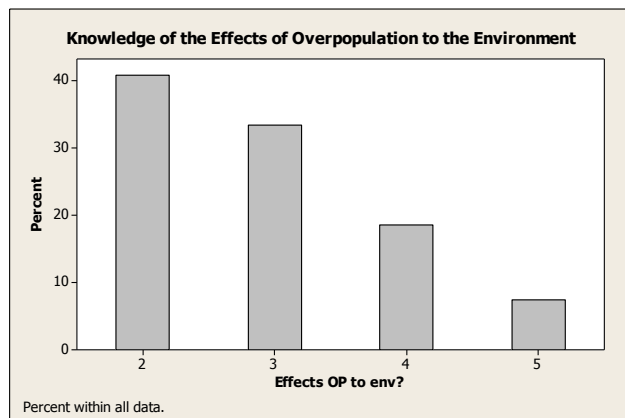
## Graphs and Interpretation

### **Knowledge of Overpopulation before and after the Garbage Project**

For this activity, we connected garbage and waste production to the Population Dynamics unit. Here, students were to learn about the effects of overpopulation to the environment. The increase of solid waste was identified as one of the most negative impacts. The impact of solid waste is very easy to perceive in the Santo Domingo area. The levels of knowledge about overpopulation were measured by assigning a number to the response given by the student in both the pre and post-tests. The scale that was used ranged from 1-5 as follows, 1: very poor knowledge, if there was no answer provided or the answer provided no accurate information to the question; 2: poor, if the answer was too simple for the grade level and had errors about the concepts asked; 3: average, if the answer was sufficient for the grade level and contained no errors about the concepts asked; 4: good, if the answer provided was sufficient with examples or ideas to complement it; and 5: great if the answer was above the grade level expectation.



In the bar graphs above are displayed the students' level of knowledge about overpopulation before (left) and after (right) by gender using clustered bars. From these graphs we can observe that category 3 (average) responses had the highest percentage both before and after the garbage project activity. However, it appears from the after graph that there was an increase in the percentage of category 3 (average) and a significant decrease in the percentage of responses in category 2 (poor) which may imply knowledge gain about concept of overpopulation after the activity.



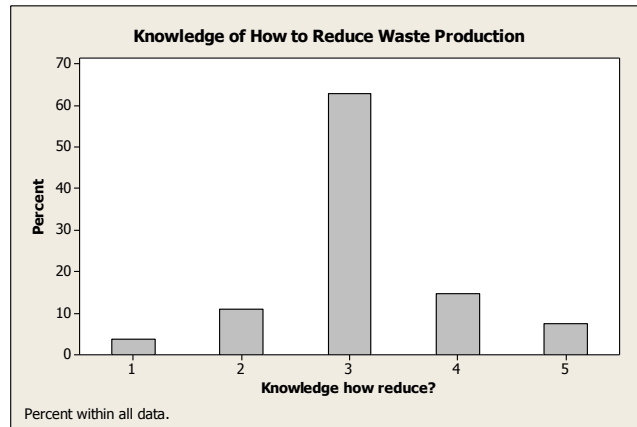
### **Knowledge of the Effects of Overpopulation to the Environment after the Activity**

Using the same scale as in the previous graphs it appears from the graphs that the highest percentage of responses was category 2 (very poor). There were also a significant percentage of category 3 (average) and some answers in the 4th, and 5<sup>th</sup> (good-great) categories. This may suggest that participating students gained a better understanding of the effects of overpopulation to the environment after participating in the activity.



### **Knowledge about Why Should Humans Reduce Waste after the Activity**

Using the same scale as in the previous graphs it appears from the graph that participating students provided a higher percentage of responses in the 2<sup>nd</sup> and 3<sup>rd</sup> (poor-average) categories. Less than 20% of the students provided responses in the 4<sup>th</sup> and 5<sup>th</sup> (good-great) categories.



### **Knowledge on How to Reduce Waste after the Activity**

Using the same scale as in the previous graphs it appears from the graphs that participating students provided a higher percentage of responses in the 3<sup>rd</sup> category. This information suggests that students were aware of how can humans reduce waste production after the activity.

### **Chi – Square Tests of Association**

The next part of the quantitative analysis also uses codified data from pre and post tests administered to the 7<sup>th</sup> grade students. The objective of these tests of association is to reveal if there is any relation between the student’s gender and some of the Yes/No responses to any of the questions.

#### **Test of Association**

Ho: Gender and response to the question “Do you think overpopulation increases waste?” before the activity are not associated (there is no relationship between the variables)

Ha: Gender and response to the question “Do you think overpopulation increases waste?” before the activity are associated (there is a relationship between the variables)

**$\alpha=0.05$ , Test Statistic  $X^2=0.020$ , Df= 1**

**P-value: 0.888**

<b>Tabulated statistics: Gender, OP increase waste?</b>			
Rows: Gender    Columns: OP increase waste?			
	No	Yes	All
F	2	15	17
	1.89	15.11	17.00
	0.006536	0.000817	*
M	1	9	10
	1.11	8.89	10.00
	0.011111	0.001389	*
All	3	24	27
	3.00	24.00	27.00
	*	*	*
Cell Contents:            Count			
Expected count			
Contribution to Chi-square			
Pearson Chi-Square = 0.020, DF = 1, P-Value = 0.888			

With a P-value of 0.888 which is greater than our alpha (0.05) we will fail to reject the null hypothesis and conclude that there is insufficient evidence at the 5% level of significance to support the claim that there is a relationship between the variables gender and the response the students gave to the question “Do you think overpopulation increases waste?” before the garbage project took place.

### ***Test of Knowledge Gain through the Garbage Project Activity***

The next part of this quantitative analysis consists of a test to see if the students showed knowledge gain after the activity. For this purpose we ran a 1 Sample T test in Minitab™, using the difference between the coded values given to the answers provided by the students in the pre and post-tests. We focused only on the question “what is overpopulation?” and the quality of the answer that each student provided. We created the difference by subtracting the coded value of the answer after the garbage project, minus the coded value of the answer before the project. However, because of the small sample size our normality test failed, making this test unsuitable.

### *Difference in Knowledge Gain by Gender*

For the last part of the activity we wanted to check if there was a difference in knowledge gain by gender. Since our samples for both female and male students were less than 30 in number, and the normality tests were not passed by either sample we used a nonparametric test (Mann-Whitney) to see if there was a statistically significant difference between the knowledge gained by female and male students.

#### **Mann-Whitney Test and CI: Diff\_F, Diff\_M**

	N	Median
Diff_F	17	0.000
Diff_M	10	0.000

Point estimate for ETA1-ETA2 is -0.000  
 95.3 Percent CI for ETA1-ETA2 is (-1.000,0.000)

The first quantity Diff A-B\_F is Eta1, it represents the female students' difference in knowledge gain; the second quantity Diff A-B\_M is Eta2, which represents the male students' difference in knowledge gain. Since the confidence interval for Eta1 – Eta2 contains all negative values (-1.000, 0.000) this implies that Eta1 is smaller than Eta2. Statistically, this suggests that the population of female students tends to have less knowledge gain than the population of male students; due to the fact that the median difference (knowledge gain) for male students is significantly higher than that for females.

### **8<sup>th</sup> Grade Project: Energy Audit Quantitative Analysis**

The first part of the quantitative analysis of this project used codified qualitative data collected from the Skype focus groups. These focus groups were composed of the student population whose parents gave consent to participate in the project. The quantitative analysis was performed using the software Minitab™.

Only 7 out of a total of 23 students (approximately 29 % of the total 8<sup>th</sup> grade student population) had consent from parents. Because we didn't have access to the total 8<sup>th</sup> grade student population, as we had initially planned, we decided to build a confidence interval to assess the results of one of the key questions in the focus group instrument. For the Energy Audit project we wanted to assess the proportion of students that had been motivated by the project to change their minds about saving energy.

In order to properly assess the responses to this question, we first have to mention and acknowledge the possibility of response bias in the sample, since the students whose parents didn't give consent to participate weren't taken into account.

### **Building a 95% Confidence Interval around a Proportion**

During the first year of the energy audit project 86 % (6/7) of the students reported to have changed their minds about saving energy. We built a 95 % confidence interval round this proportion to produce a plausible range of values in which the true population proportion of 8<sup>th</sup> grade students that had been motivated by the project to change their minds about saving energy is located.

The confidence interval for a proportion is built by taking the proportion observed in the sample and then adding and subtracting a margin of error. The margin of error for the 95% confidence interval is equal to approximately 2 standard deviations.

#### **Test and CI for One Proportion**

Test of  $p = 0.86$  vs  $p \text{ not} = 0.86$

Sample	X	N	Sample p	95% CI	Z-Value	P-Value
1	6	7	0.857143	(0.597918, 1.000000)	-0.02	0.983

Using the normal approximation.

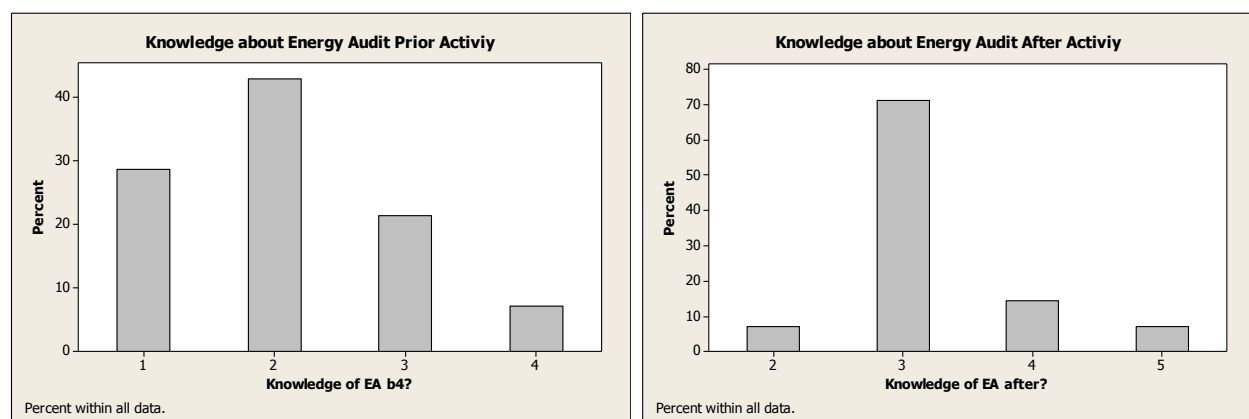
The 95% Confidence Interval for the proportion is (0.6, 1.0), therefore, we are 95% confident that the true population proportion of the 8<sup>th</sup> grade students who had changed the way they and/or their families tackle saving energy practices as a result of participating in the project



is between 60 % and 100%. This confidence interval suggests that a proportion of at least 60% of the participating 8<sup>th</sup> grade students had changed their minds about saving energy. This change of mind was reflected by the students as having gained awareness about their own high levels of energy use, and also in some cases it also triggered a change of behavior towards reducing their energy use.

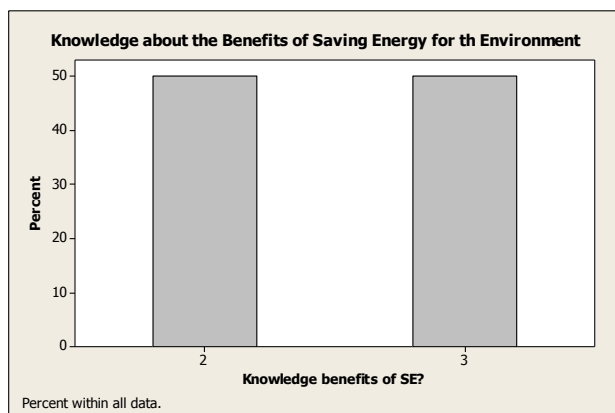
### Graphs and Interpretations

The levels of knowledge about what an energy audit were measured by assigning a number to the response given by the student in both the pre and post-tests. The scale that was used ranged from 1-5 as follows, 1: very poor knowledge, if there was no answer provided or the answer provided no accurate information to the question; 2: poor, if the answer was too simple for the grade level and had errors about the concepts asked; 3: average, if the answer was sufficient for the grade level and contained no errors about the concepts asked; 4: good, if the answer provided was sufficient with examples or ideas to complement it; and 5: great if the answer was above the grade level expectation.



In the bar graphs above are displayed the levels of knowledge about energy audits before (left) and after (right). From the before graph we can observe that participating students provided a higher percentage of categories 1 and 2 responses (very poor- poor) before the energy audit activity was implemented. In the after graph we can observe a significant increase in category 3 responses (average), as well as a significant decrease in the category 2 (poor) responses. Also in

the after graph, a slight increase of answers in the higher categories 4 and 5 (good-great). This may suggest improvements in the knowledge about energy audits in participating students.



### **Knowledge of the Benefits of Saving Energy for the Environment after the Activity**

Using the same scale as in the previous graphs it appears from the graph that participating students provided the same proportion of responses and only in categories 2 and 3 (poor and average). In fact, none of the participating students provided answers in any other category higher than average.

### **Chi – Square Tests of Association**

The next part of the quantitative analysis also uses codified data from pre and post-tests administered to the 8<sup>th</sup> grade students. The objective of these tests of association is to reveal if there is any relation between the student's gender and the Yes/No responses to any of the questions in the pre and post-tests. However, because the data set is very limited this test did not render viable results.

### ***Test of Knowledge Gain through the Energy Audit Activity***

The next part of this quantitative analysis consists of a test to see if the students showed knowledge gain after the activity. For this purpose we ran a 1 Sample T test in Minitab™, using the difference between the coded values given to the answers provided by the students in the pre

and post-tests. We focused only on the question “what is an energy audit?” and the quality of the answer that each student provided. We created the difference by subtracting the coded value of the answer after the garbage project, minus the coded value of the answer before the project. However, because of the small sample size our normality test failed, making this test unsuitable.

### *Difference in Knowledge Gain by Gender*

For the last part of the activity we wanted to check if there was a difference in knowledge gain by gender. Since our samples for both female and male students were less than 30 in number, and the normality tests were not passed by either sample we used a nonparametric test (Mann-Whitney) to see if there was a statistically significant difference between the knowledge gained by female and male students.

#### **Mann-Whitney Test and CI: Diff\_F, Diff\_M**

	N	Median
Diff_F	9	1.000
Diff_M	5	2.000

Point estimate for ETA1-ETA2 is -0.000  
95.4 Percent CI for ETA1-ETA2 is (-1.001,1.000)

The first quantity Diff A-B\_F is Eta1, it represents the female students’ difference in knowledge gain; the second quantity Diff A-B\_M is Eta2, which represents the male students’ difference in knowledge gain. Since the confidence interval for Eta1 – Eta2 ranges from negatives to positive values, therefore, including the zero value in it (-1.001, 1.000) this may imply that Eta2 is greater than Eta1. But this may also suggest that there may be no statistical difference in knowledge gain in males or females because zero is contained inside the confidence interval. If the difference between the two samples is zero, then the two samples may have been the same. This makes the results of this test unreliable.

### Summary of Quantitative Results

Grade	Test Results				
	95% CI	1 <sup>st</sup> Chi Square Test of Association	2 <sup>nd</sup> Chi Square Test of Association	1 Sample T Test	Mann-Whitney Test
5	(66%, 98%)	No relationship between gender and student's responses before activity	No relationship between gender and student's responses before activity	Lower bound of 95% CI = 1.062 >0 confirms knowledge gained	(0.000, 1.002) / 0 inside interval: Test invalid
6	(19%, 59%)	Insufficient Data/ Test Unsuitable	Insufficient Data/ Test Unsuitable	Insufficient Data/ Failed Normality Test	(-1.000, 1.000) / 0 inside interval: Test invalid
7	(59%, 100%)	No relationship between gender and student's responses before activity	Insufficient Data/ Test Unsuitable	Insufficient Data/ Failed Normality Test	(-1.000, 0.000) / 0 inside interval: Test invalid
8	(60%, 100%)	Insufficient Data/ Test Unsuitable	Insufficient Data/ Test Unsuitable	Insufficient Data/ Failed Normality Test	(-1.001, 1.000) / 0 inside interval: Test invalid

## **Results: Qualitative Analyses**

### **Qualitative Analyses**

These analyses first targeted the qualitative data gathered through the implementation of the pre and post-tests for each grade level and activity. The second part of the analysis focused on the qualitative data gathered from the Skype focus group sessions with the students. The final part of the qualitative analysis used the qualitative data gathered from the Skype focus group sessions with the teachers and staff of the Community for Learning School involved in the projects.

The analysis of the data consisted in identifying possible patterns within the answers provided by the participants that may suggest reasons for certain behaviors, or attitudes. Also, by analyzing the data we hoped to find strong and weak points for each of the projects, while at the same time assessing the students', teachers' and staff's suggestions for future improvement, and possible further research opportunities.

### **Skype™ Focus Interviews**

Because the activities took place in Santo Domingo and the researcher was in the US, the software Skype™ was used for the focus group session and the software Camtasia™ was used to record the conversations as they appeared on the computer screen. This way, the researcher had access to the conversation sessions to go over them after they were over. However, internet reception problems often made the sessions longer than programmed which caused participants to become tired and unfocused at times. Another challenge presented by failure in the connectivity or internet signals is that it interfered with the audio quality of the recording making certain parts of conversations have an echo, or become inaudible.

The focus groups sessions provided more insight about the students' feelings and perception of the activity. Also, the questions were less structured and students were motivated to join the conversation by the researcher to obtain more complete answers.

## 5<sup>th</sup> Grade: Composting Project

### Pre and Post Tests Qualitative Analysis

The majority of the students had no previous knowledge about composting. In the pretest the students were asked how they felt about producing fertilizer from their lunch waste and garden waste, the responses obtained were mainly positive, showing that the students had a positive attitude at the beginning of the activity. It appears that the main reported reason to participate in the composting activity was to “help” nature or the world. However, the quality of the answers provided by the students when asked in the pre-test how they thought composting would help the environment, confirmed that they had little to no knowledge of the benefits of composting for the environment.

*“...I feel good and I think I am saving the world like that...”, “... I would feel proud. I really want to save the environment...”, “...Good because that would help the plants and global warming go down a bit...”, “... good because it helps the planet...”, “... It will be fun and it will help the planet...”*

It appears that students had an unrealistic scope of the possibilities of the effect of their school composting project for the environment. While by no means would their project save the planet, it certainly gave them a positive attitude towards composting which is certainly an environmentally friendly activity.

Students were also asked in the pre-test if they thought composting could reduce the amount of garbage. Many students did not answer the question, and very few answered positively. Of those who answered positively the majority didn't provide an explanation of how this was to happen. These responses may have suggested that students hadn't found the relation between waste and composting before the project. However, the majority was willing to try composting at home.

After the composting activity was well on its way and the school year was almost over the post-tests were administered. The post-tests were less structured than the pre-tests. They had fewer questions and all of them were open ended. The post-tests were designed this way to give

students as much freedom to answer as possible, counting on them to express as much of the knowledge gained as possible.

Students were asked the question “what is composting?”, while some students were able to mention the end product of it or the purpose of composting, many were not able to provide accurate responses. However, the students who did provide average to great responses suggest that there was knowledge gained through the composting activity. Some of the answers were as follows:

*“...Is producing fertilizer from cut grass and leftover food...”, “....Is when you turn natural materials into fertilizer...”, “... Is when you make fertilizer for plants to grow with waste...”, “... Is taking greens and browns to a fenced-in trash can and wait for it to decompose...”, “...It’s a way of making dirt with specific leftover foods...”*

These responses suggest that students learned the basics and purpose of composting, however they do not imply that students would favor or be motivated to start composting at home. To look for evidence that students would be willing to try composting at home we looked at their answers in both the pre and post-tests. The vast majority of the students stated that they were willing to compost both on the pre and post-tests. However, not many were actually composting at home after the activity was coming to an end. Neither the structured questions of the pre-test, nor the open ended questions in the post-tests revealed the factors or motives that impaired them from composting at home.

## **Skype™ Focus Groups Interviews**

### ***Limiting or Prohibiting Factors to Composting at Home***

In order to find out what factors were keeping many students from starting to compost at home, the students who confirmed they had not tried to compost where asked why. There were many consistencies among the answers. The most mentioned were not having enough space, students or parents not having enough time, not having the materials available, having pets or pests problems or simply just forgetting about it. Some of the answers were as follow:

*“... No, because my mom is occupied all day...”, “...the thing is I have a big dog and the dog is always messing with things... everything that we put in there he will eat, even wires, everything...”, “...we live in an apartment, and I think it would be difficult...”, “...because we don’t have the materials... there is not enough trash...”, “... I think I just forgot...”, “...because there are lots of cockroaches and rats near my house...”, “...well, in my house we don’t really have a lot of garden...”, “...I forgot to tell my mom...”, “...my parents are very busy...”*

-Complete transcripts of the 5<sup>th</sup> grade focus group video sessions available in Appendix 26

These answers confirmed that students had various reasons for not having started to compost at home. Many of their concerns and reasons not to compost could be easily addressed because they are misperceptions about the practice of composting. The pets and pests problems can be avoided by composting properly and having a suitable and enclosed bin that families can do themselves and customize to their needs of space. The need for space can be addressed by showing students different ways to compost in small places like apartments, and at the same time, try to address the parent’s busy schedule by teaching them how composting in small containers can consume little time, and needs less garbage, in comparison with their school project. These are all things that should be integrated into the lesson plans in order to improve the composting project for the following school years.

### ***Students’ Suggestions for Project Improvement***

Students were asked if they would change anything about the way the composting project was done, what would that be and why. This question was looking to reveal what students thought were the weaknesses of the composting project. Some of the answers were as follow:

*“...I would like have more people doing it, like some people could do it at home and then bring it to school when it’s ready so we could have multiple composting places and do it faster...”, “... I would put more composting bins so we could make more at the same time...”, “...I would change the way we collect the trash just have one big one instead of many small ones because it is very difficult to collect the trash...”, “...kids keep putting the trash in the wrong trash cans, me and my friend went to all the classrooms explaining that was bad because they don’t put the trash where it needs to go!...”, “...we need help teaching kids where to put trash where it belongs, because even when we tell them they still don’t understand...”. “...I wish we had more time to dedicate to the project...”, “...I think I would go again to all the classrooms to tell the kids that go in the compost trash because there was a time that there was a problem because nobody almost put trash on the compost trashcan...”*



Based on their answers, students suggested that they needed more time to work on the project, wanted more students to help them, and also recommended making a different information campaign at school because the one they used didn't yield the desired results. These suggestions should be integrated into future lesson plans to make the composting project run more smoothly the next time. However, the reality is that lack of time during the school year may impair teachers from allotting more time to the composting project.

### ***Staff and teachers perception, suggestions and overall comments***

#### ✓Challenges and suggestions

Students, teachers and staff shared some of the misperceptions, suggestions and concerns regarding the composting project. When staff and teachers were asked “Did this activity motivate you to start composting at home” both teachers, and 2 out of the 3 participating staff members expressed having the desire to do so but certain factors got in their way. Some of their answers were as follows:

*“... I am scared to try it myself because that sounds difficult, it just sounds complicated to me, and the things that I see online are this very special (makes signs with her arms suggesting large composting units) composting things , and I just won't be using that myself...”, “... Well my idea was you have to have a yard to make it... And if you don't have yard, then you can't do that, that's what I thought, and that's why we were doing it at school...” , “...I guess is getting over the fear factor, the reason why people would easily separate garbage is because is easy, but the composting sounds more scary...” , “...In our house we started recycling, we have different areas for the different things, and then my next step is composting, if Gaby teaches me how to do that, and honestly I've been wanting to for months and I feel like I don't have time, and I put it off... you know?...”, “I don't have garden, I live in an apartment, I have three kids I have two jobs... Me too I live in an apartment, I'm not even close to grass...”*

-Complete transcripts of the 5<sup>th</sup> grade teachers and staff's focus group video sessions available in Appendix 30 & 31

These answers revealed a common misconception created by the way the composting project was planned to be implemented at the school. Since the project was conceived and planned by the researcher as a group project and to be implemented at a moderately large scale, this created the misconception that you could not compost in small living quarters or

individually. The suggestions provided by staff and teachers were for next year to integrate as an activity showing ways in which everyone can compost at home, as a “do it yourself” project in a smaller scale, also to show the simplicity of it, and how little time consuming it can be.

When staff members and teachers were asked “which were the biggest challenges for the composting activity?” there were a few factors in common, the main being lack of time to dedicate to the activity, and including other such as the need to improve the connection of the activity to the curriculum, and having somebody in charge of logistics. Some of the answers were as follows:

*“...The difficulties are definitely, that you need someone to be on top of it... because Gaby can't do it all and still do her job of overseeing teachers...”, “...need more time, with the different classes...”, “...the taking kids out of practice time, or class time, that sort of thing... we would definitely have to make it part of the curriculum so it doesn't seem like it's something extra, integrating it to the curriculum as much as possible, which is what we've always wanted to do anyway!...”, “...the integration into the curriculum although it was done... need to be a little bit more cohesive, and the teacher involvement there is key... they don't feel like they can make the decisions, and yet they can...”, “... the money... the money issue... it costs a bit...”, “...the concept that everybody had to be involved, had to participate... there were just some kids that you wouldn't put in charge, or you wouldn't allow them to do it, because is not in your best interest, so that was a challenge...”*

Based on these answers better planning is fundamental in order to try to integrate the composting activity with the Rocks and Mineral theme. Another suggestion was proposed by the teachers. The idea was making the composting activity its own theme in order to be able to dedicate more time to it. However, this suggestion would be to the detriment of all other themes being taught since these would have to be cut short to make time to include the composting activity as a new one. As a way to tackle the money issue, staff suggested to add fundraising activities as part of the planning of the activity. Money investment in the composting project wouldn't be as big an issue for the years to come since the initial investment was all to get the project started. Once set up the composting project would run mostly on waste and student and teacher labor. The issue of all students participating, which was brought up by the teachers, was no different than the challenges they face each day inside the classroom to try to get all students equally engaged and interested in a topic. Planning the composting activity more thoroughly

could provide the teachers with more time to dedicate to finding ways on how to manage this challenge with the unresponsive students.

Teachers stated that the theme Rocks and Minerals, to which the composting activity is connected, is very broad and they can barely cover all the material for it in six weeks. They claimed that composting didn't necessarily connect with the theme and that it is also very broad hence the suggestion of making it a separate theme. However, they acknowledge themselves being little prepared to teach both the theme and the composting activity. Some of the answers were as follows:

*"...When you consider the many things that you do in one day, and all that we supposedly cover (teacher makes quotation mark signs with her hands when says the word cover), I would say not very well prepared at all, because in general, teaching rocks and minerals, that's something that I am learning so I can teach my kids the theme (makes quotation mark signs with her hands when says the word theme)..."*, *"...we have 6 weeks for a theme ... and all the things we have to cover for rocks and minerals is very broad, and composting I think is very broad itself so I think composting should be its own theme..."*, *"...we collaborated with Gaby at some point, you know, keeping the kids were doing what they were supposed to be doing, but aside from that we were not involved in the composting project right now, more than that..."*

These answers identified lack of training as a challenge for the teachers who did not feel that they could be in charge of the composting activity, not only because the lack of time for it, but also because they did not feel adequately prepared to teach it.

#### ✓ Overall perception and future of the project

The composting project left a positive impression among staff members, teachers and students. Staff and teachers saw the impact the project had on the students, and also perceived the activity as good for the environment, and supported the continuation of it in the next school year. In fact, during the focus group conversation with the members of the staff they guaranteed the continuance of all of the activities during the next school year, and also guaranteed the inclusion of one environmental activity per grade in future years. Some of the answers were as follows:

*“...it was such a hands-on project and actually visualizing it, it was so tangible that that’s why they enjoyed it, it was different than what they’re used to doing in the classroom that it came out to be something productive for them...”, “...because instead of buying inorganic fertilizer why not just make it yourself and you’re recycling and its less trash..”, “...naturally anything that is reusing or recycling is a good practice...”, “...when speaking to the kids it definitely comes out that they really are involved in the day to day happening of the projects happening with the projects, so they (the projects) are really theirs and we see that...”, “...I was going to say that in the Aldeas the direction(administration) is very excited about doing composting, not only about the garden, it started out as having a garden but they really want to do the compost too...”, “...And another thing, prospective new parents when they come in and they see this (the projects), they are quite impressed with it...”*

These answers showed, to differing extents, how positive the composting activity and other activities have been in different levels of the school population. This suggested that not only the student population benefited from the composting activity, but also the staff, teachers, and parents whose children were involved were exposed to the activity. The activity will be shared with another Community the Aldeas Infantiles by the students and teachers increasing the scope of this activity more than initially expected.

## **6<sup>th</sup> Grade: The Garden Project**

### **Pre and Post Tests Qualitative Analysis**

While at the time of the pre-test the students had already heard about what a school garden was from the teachers and the coordinator, the answer they provided suggested that their knowledge about it was rather average. Some of the answers provided were as follows:

*“...gardens to plant food and to sell it...”, “...you can plant vegetables and fruits and sell them if you want...”, “... a place where we plant...”, “...every kid works together to grow stuff...”, “...that you need to take care of it...”, “...that vegetables grow in our school...”, “... a school garden is garden that kids in school contribute in...”*

These answers suggested that even though students had heard about the concept of a school garden their knowledge, as demonstrated in the pre-test, their knowledge was not above the obvious after taking the pre-test.

The garden project was conceived and developed to be connected with the Poverty theme, as an action project. The majority of the students answered negatively to the question “Have you heard what an action project is?”, however; they seemed to understand the ultimate purpose of the garden was to try to help another community in need. Some of the answer they provided confirmed this:

*“...is a project that it doesn’t help you, it helps others...”, “... you can sell it in a cheap price to help poor people...”, “...plant stuff to help the environment and to give food to people...”, “...if we plant, people who live in that area could benefit and buy or take the fresh food that is planted...”, “...you can plant vegetables and sell it or give it away to poor people...”, “...because we use an unused space and do something with it that can help others...”*

The garden project started early in the school year and the connection with the Poverty theme was to take place almost at the end of the school year. However, it appears from these answers that students were able to see the connection since the beginning of the project. While in the pretests the students seemed to be aware that the garden project could be beneficial to the environment in some way they were not very clear about why this was. The students were asked to answer the question “Do you think that growing vegetables in an unused space can help care for the environment and why?” and some of the answers provided were as follows:

*“...you learn to care about nature...”, “...because plants help the Earth...”, “...because it’s beautiful and it’s helping the environment...”, “...because it gives life...”, “...because we are making more plants grow and that is great for the world...”, “...because you’ll be planting for oxygen...”, “...because you don’t have to cut down other plants...”, “...because it makes nature and helps the planet...”, “... because the plants help the environment...”, “...because the area will no longer be useless and our environment will be used for something ...”, “...because plants give oxygen...”, “...so we can make this planet greener...”*

These answers were an example of what the students thought could be the environmental benefits to having a school garden at the beginning of the activity. We observed that the answers suggest that even though they had received information about the school garden prior to taking the pre-test it wasn’t enough to provide grade level answers. By looking at the post-tests we hoped to perceive knowledge gain about the garden project and the positive environmental effects that it could have by looking at the quality of the answers provided by the students. The

students were asked “What do you think some of the benefits are for the environment of having a school or home garden?” Some of the answers were as follows:

*“...having a pretty space in the place...”, “...you help the Earth by planting...”, “...if we plant vegetables that, gives oxygen...”, “...plants are pretty and they produce oxygen for all of us...”, “...because our environment is being polluted so if we help giving or doing or planting a tree or a plant makes all better...”, “...it clears the air...”, “...you can grow plants and that way it’ll keep growing and the world will be better...”, “... because we create more oxygen and without gardens we die...”, “...you can eat the content of your garden...”*

We observed in these answers that students seemed not to know the benefits for the environment of having a school garden other than the plants can be used for ornamental purposes and that they produce oxygen that we breathe. The students also seemed to have unrealistic expectations about the scope of these benefits thinking that they would help the planet be a better place. Since these answers from the post-test were not very insightful we turned to the questions in the Skype focus group sessions to see if the students were able to provide better answers orally.

## **Skype™ Focus Groups Interviews**

### ***Environmental Benefits of Having a School Garden***

In the focus groups interview sessions the students were asked to name some of the environmental benefits of having a school garden to see if we were able to get more complete answers than in the post-tests. Some of the answers were as follows:

*“...Because we help nature to grow plants and be more... (looks puzzled) and have a school that’s more natural...”, “...it can be good for the animals we have in school ...they sometimes eat our plants (students laugh), and I think that they feel really good about it! (She smiles)...”, “...I guess... maybe because we water the soil, put nutrients in the soil, and the soil it helps the plants grow...”, “...I think that is good because plants recycle the air, and we’re helping with deforestation because we are planting plants...”, “...Because we’re planting more plants, we’re being green...”, “...It helps to clean the air...”, “...If we grow more plants it can help the pollution and we can live more, like making it go away...”, “...Instead of pesticides we used organic pesticide from tobacco seeds...”, “...We’d be helping because we do it naturally...”, “...we would support life for worms, and other animals, and things that live in the soil...”, “...We’ll have more green...”*

-Complete transcripts of the 6<sup>th</sup> grade focus group video sessions available in Appendix 27

These answers provided a little more information than those in the post-tests, however; we can still see the same pattern of thinking among the students. The most mentioned environmental benefits they could think of were the ornamental enhancement, and the production of oxygen. Some of the answers suggested having school or home gardens can help decrease deforestation and pollution, improve soil health and animal life, which added to the post-test information suggesting knowledge gain. Even though these answers suggested knowledge gain, these were fewer in number among the participants giving room for improvement in future school years.

### ***Limiting or Prohibiting Factors to Gardening at Home***

In both pre and post-tests students' answers revealed them to be excited to be working in the garden and be working in a group, and the majority of the answers when asked "would you be willing to try growing vegetables at home?" were positive. However, when looking at the number of students who confirmed having started to grow something at home after the activity very few had started a garden. In order to understand what factors were impairing students from growing vegetables at home we had to take a closer look at responses provided in the focus group sessions. Students were asked "Have you started to grow anything at home? Why yes or no?" some of the answers were as follows:

*"...No, because it is expensive, it needs space, well in my house I have a really big backyard but is expensive, and it's really hard to maintain it...". "...I have three dogs! And sometimes they eat plants! I have German shepherds, and he is crazy all day, and eats everything! (laughs)..."*, *"... I don't know because I live in a 'residencial' (apartment complex)..."*, *"...No, because I live in an apartment..."*, *"...they're building in my house, but we are going to start in the roof..."*, *"...Because there's not enough space... I have a backyard but is with cement..."*, *"...I haven't tried to plant yet because I live in an apartment and I don't have any space..."*, *"...I haven't really tried because I don't really have the space to do it, but if I had them I would do it... I have back yard but, it's really small, and it has a floor, not grass..."*, *"...Not yet, we don't really have enough space... I live in a house, the front yard is made out of cement and the back yard is made out of grass but it's like, mmm..., is only 6 ft long... my parents think that there is not enough space to grow things at home..."*

By looking at these answers we can observe a few recurrent factors that have made growing vegetables at home hard for the students. Not having enough room, living in an apartment and having a cemented backyard were the most common. Santo Domingo is a big city that is experiencing vertical growth, lack of space or cemented yards, often used as parking space may make the activity of growing vegetables daunting. These factors need to be introduced into the lesson plans for future years to be able to show students different ways to grow vegetables in small spaces and apartments, to make sure they take the garden home. Some mentioned having dogs that would make it difficult to plant and other few mentioned not having time for it and being expensive. This last response may have derived from the impression perceived by the students, since the school had the initial investment for the school garden. However, the nursery was built using recycled materials such as plastic bottles and old tires. Reinforcing the use of recycled materials and unused space for gardening was identified as a priority for future years, in order to avoid students perceiving gardening at home as something expensive and as labor intensive as a big school garden.

### ***Students' Suggestions for Project Improvement***

Students were asked to mention what would change to improve the garden project for future school years. Some students did not think that they needed to change anything but others did have things they wanted to improve. Some of the answers were as follows:

*“...we should put more time into planting here...”, “... would change the place that we planted because there are too many bugs...”, “on the side of 2<sup>nd</sup> and 3<sup>rd</sup> grade the dogs always step on them... and there are too many insects, you can see “orugas” (caterpillars) eating the little plants...”, “...I would change where is hydroponics ... first it was on the roof and now is near the pool, but I see that when the kids go to the pool they splash water with bleach (chlorinated water from pool) and they kill the little plants...”, “...that it would be like, kind of good that the whole school had like... that we would grow more things...”, “...the nursery is an issue because they don't grow much and not necessarily because of the sun but becomes a point where there's too many together so we need to take them and plant them where they go...”, “I would change the nursery to an area with more sunlight, and also the ones near the soccer field because sometimes the kids kick the ball and it lands on the plants...”, “...Maybe the plants could be a little bit closer together so that people don't forget to water them because they don't see them...”*



Based on the answers provided, we saw that students were very concerned about the location of the different plants, for a variety of reasons. The school garden consisted of a set of growing stations scattered across the school's campus. The idea was to use some of the unused space in the school yard; however locations had to be changed before the beginning of the project because electric lines and water pipes were under the soil of the selected areas. Because of this, raised beds had to be used as an alternative, a small rooftop garden was implemented and a nursery made of recycled containers and materials was devised. These were all located in different places, but in all locations some student disturbance, such as playing or running over plants, was reported. Rather than changing the location of the garden spaces it would be easier and less costly if students tried to make the rest of the student population more careful when moving and playing around the planted spaces.

### **Staff and Teachers**

#### ✓Challenges and suggestions

Some of the suggestions and challenges mentioned by staff members and teachers were the same for both the composting and school garden project. Some of the answers provided were as follow:

*“...The difficulties are definitely, that you need someone to be on top of it... because Gaby can't do it all and still do her job of overseeing teachers...”, “...need more time, with the different classes...”, “... the whole logistics of when to pick things out when they're done, when they're ready to sell them, when to plant again, and all of that logistics is a hard thing, it has been the hardest, hardest, thing, and we are like making it up as we go...”, “...: the daily work, keeping it, needs to be more organized, I think we need training...”, “...after the first time we got tomatoes and everything, the up keeping I would say was the hard part, we had less time for that, but we also had less awareness of how to be on top of that, to keep-up with the garden”, “...the sustainability of the garden, a lot has been invested, we've spent so much money and we haven't really gotten many things out of it, it was nowhere near anything that we could've sold and get a fraction of what's needed to keep the garden going, so keeping it sustainable would be a really big challenge....”, “...I would say a lot more control over the garden area while nobody is working on them...”*

-Complete transcripts of the 6<sup>th</sup> grade teachers' focus group video sessions available in Appendix 32

At the time of the interview the vegetables were still growing, and the hydroponics section was not successful, therefore, the expected maximum yield of the garden was not achieved. These factors, accompanied by the initial monetary investment to set the garden up, made it hard to see that the garden could, and would be sustainable in the long run. Subsequent years would require less monetary investment. Further, the 5<sup>th</sup> grade composting project would be able to supply fresh compost to mix with soil. Teachers also felt underprepared to manage and run the garden with the students suggesting that they needed training, and more time to dedicate to the project. A strategy to protect the planting places when no one is working on them should be planned and put in place for future years to increase the yield of the garden. Also, a more structured and detailed schedule to care for the garden before, during, and after picking the vegetables would help with the logistics issues they've been having.

We asked the teachers if they thought that the students had learned about the possible environmental benefits of having a school garden. Their answers confirmed what we already had deduced from their answers in the focus sessions. The teachers' answers were as follows:

*"...I don't think they understood that at all, but I think they need to understand it and I also think that a lot younger than 6<sup>th</sup> grade they should have more information on this..."*, *"...I would've expected a lot more awareness regarding the connection between the garden and the environment, but what they did I feel that they got, was the community aspect of it, the working as a group..."*, *"...I think that there is an incredible potential to raise a lot of environmental awareness on the kids, but I think they have to be connected since they're very little..."*

These answers confirm that the students did not obtain sufficient knowledge about the environmental benefits of having a school garden. Incorporating activities that help reinforce the connection between the school garden and the environment into future lesson plans will help reduce the gap in knowledge gain.

#### ✓ Overall perception and future of the project

Staff members and teachers were asked to express their overall perception of the garden project. The answers provided were all very positive suggesting that both staff and teachers were pleased with the outcome besides the challenges encountered. Some of the answers were as follows:

*“...we think it’s an awesome idea and we have enjoyed it and we have learned a lot. We’ve also used it to build attachment with our kids, to get to know them, to get to know ourselves as teachers with our kids...”, “...it should be reinforced from pre-K to 12 grade, we should have the whole school in that...”, “...I think that from pre-k or from kinder they should be connected to the garden, everybody should be a part of the garden in some way, so they are building on that (environmental)awareness every year...”, “...They (students) also have been talking to other kids in other schools and they were bragging about the garden and I mentioned it to one of my friends that lives in NY, and she was impressed, she said “wow that is a great initiative” ...is a great project we just need to really take advantage of it...”*

Judging by these answers we observed that the garden project was perceived as a great activity. Teachers suggested that this should be made an activity designed for the entire school to participate, to help spread environmental awareness school wide. The garden served as a catalyst for building student-teacher relationships, and also for promoting the school to prospect parents. All staff members and teachers suggested that the activity should be continued for future years. Among the suggestions made to improve it for future years were to start earlier in the school year (which would be easier now that the initial structure and organization process was completed), to make the entire school participate, and to provide the teachers with better training and expert help to keep the garden running and functioning smoothly.

## **7<sup>th</sup> Grade: The Garbage Project**

### **Pre and Post Tests Qualitative Analysis**

The Garbage project was connected to the Population Dynamics unit. It connected more directly with the environmental impacts of overpopulation. The pre-tests confirmed the students having previous knowledge about the concept of overpopulation. They had heard about before in different classes at the school, such as, Social Studies and Math. This confirmed that our qualitative data was not compromised, and that the pre-test was administered before the activity had begun. The students had a good idea of what over population was, and some were able to mention environmental impacts associated with it, before the garbage project began. Some the answers they provided were as follows:

*“...overpopulation is that the world is getting more crowded each day, so there is more contamination, which can lead to global warming...”, “...there are more people and waste...”, “...as the population grows more individuals produce waste...”, “...if the population grows, and there are more people then there is more waste, because more people eat and use products, so there is more trash...”, “...when a place is overpopulated with more people, that is too many people in one area...”, “...there is going to be more people, more consuming, more garbage...”, “...if the population increases and keeps growing, people eat, and eat and all that waste keeps increasing...”, “...the more people, the more trash is thrown because more products are consumed...”, “...because as population grows, waste grows because there are more persons producing it ...”, “...overpopulation is the concentration of individuals in an area ... the more people there are the more trash we produce...”*

These answers showed that many students were able to make the connection between overpopulation and the increase in waste, even before the garbage project started. Since students had average to good knowledge of overpopulation and linked waste production with it we turned to the post-test to see if we could perceive an increase in knowledge after the activity. The students were asked “what are some of the effects of overpopulation on the environment?” some of the answers were as follows:

*“...deforestation because of more buildings...”, “...contamination...”, “...air pollution and trash contamination...”, “...less environment for animals...”, “...contaminating places with trash, create air pollution and global warming...”, “...produces more trash, contaminating the land...”, “...you create too much trash and that causes pollution and you cut down trees to do construction...”, “...there is less biodiversity, more pollution and more animal extinctions...”, “...contamination, pollution...”, “...construction take away biodiversity...”, “...pollution, sickness and less ecosystems...”, “...trash...”, “...people need more space and take out animals out of their habitat...”, “...contamination and trash...”, “...there is too much trash and that affects biodiversity and increases illness...”, “...more deforestation, more hunting, more animals in danger...”, “...pollution which leads to global warming, deforestation and biodiversity gets endangered...”*

Looking at these answers we can observe that even after the garbage project the most mentioned effects of overpopulation to the environment were contamination and pollution. However, students were able to mention many other effects like increasing illnesses, decrease in biodiversity due to loss of habitat and ecosystems, global warming, and deforestation. This suggests that there was a knowledge gain about the effects of overpopulation after the garbage project. The vast majority of the students stated in the post-tests that humans do need to reduce the amount of waste they produced in order to decrease the environmental impact of waste. However, when asked in the post-test the question “Can you name some of the things we can do

to reduce the amount of waste produced at home or at school?” many of the answers didn’t go beyond naming reduce, reuse and recycle. While these answers name practices that indeed help reduce waste production they don’t provide any insight about the knowledge the students had about each practice.

## **Skype™ Focus Groups Interviews**

### ***How to Reduce Waste Production***

In order to find out if the students really grasped the knowledge behind the practices of reducing, reusing and recycling we had to look at the data collected in the focus group sessions. Students were asked “How do you think reduce, reuse and recycle can reduce the amount of waste we produce?” Some of the answers were as follows:

*“...Because if we reuse things, we throw out less garbage, so there would be less garbage...”, “...that if you use paper and you recycle it you will have less paper in the garbage... and less trees would get cut...”, “...well if you can, at home you can reuse cans and lots of things we usually throw out and so the other people like the person who works in your house will start seeing you and they will start maybe doing it and then it evolves and more people do it...”, “...I think that reuse when you’re drawing on a paper you can reuse it on the back, like using both sides of the paper to draw...”, “...I think that we can reduce, when we can decrease the amount of garbage, because part of that garbage will be recycled and the garbage would be less, if we make other things out of it...”, “...I think that reduce, reuse and recycle can decrease the amount of garbage that we produce because there are some materials we produce that take a lot of time to be produced, and if we reuse and recycle more we give it time to make more... we are actually not having to buy as much and therefore not creating as much garbage...”*

-Complete transcripts of the 7<sup>th</sup> grade focus group video sessions available in Appendix 28

It came across as the discussion with the students took place that students weren’t really clear on differences between reducing, reusing and recycling. Another thing that surfaced during the conversation is that students were not clear on what materials were recyclable. Even though the school had become a collection center for certain recyclable materials like paper, cardboard, and plastic bottles, students were not aware that they could contribute by bringing recyclables from home to school. All of these factors suggested that students had not been very engaged or interested in the garbage project.

### ***Behavior Change after the Garbage Project***

In the post-tests students were asked “Do you think humans should reduce the amount of waste they produce?” and the majority of the answers were positive. However, we wanted to see if the activity had made them more conscious about the way they and/or their families disposed of their garbage. During the interview sessions the students were asked “Did the garbage project change your mind about the way you and your family take care of and deal with garbage? Some of the answers were as follows:

*“...It changed my way of thinking by me seeing all the amount of trash that we throw in our environment and I try to change it by not trying to waste so much paper...”, “... I gave them (family)an idea of using a thermos instead of buying bottled water...”, “... now I am more conscious of what I am throwing in the trashcan and thinking of what more would I do...”, “... I always knew about the trash problems and it (the project) changed my mind a little bit but I am still doing the same, and I never thought that I could save much paper or all that so I am still doing the same...”, “...I don’t think I contribute enough to garbage... because there are more people in this world...”, “...I think that if the country would recycle that it would make a great difference...”, “... We didn’t know how to be involved , and I didn’t know where the recycling centers are, you know...”, “...now I can see trash in a different way for example I can reduce what I consume and recycling...”, “... before the project I didn’t realize how much garbage we produced in my house, and I didn’t realize that a lot of the trash that we produced was recyclable and I’ve started to recycle...”, “...Now I try to use less paper, because one of the things that we in our house was paper so I’ve started to use less paper...”, “...In my house we started using less bottles, and the bottles that we use we recycle...”, “...Well at least me, is not like everyone in my house, I’m reducing the amount of paper that I use...”, “...I realized that in my house there was a lot of trash, and I told my parents and so now we buy less paper for the month...”, “... We are recycling newspaper and using less paper at home...”*

By looking at these answers we saw that many students were concerned with buying, using and wasting paper. This was the only material that stood out as being recyclable, reusable, or reducible. Plastic bottles were also mentioned, but not nearly as much as paper. We also observed that many students did not know where the recycling centers were in the city of Santo Domingo, and were not aware that their own school was collecting recyclables. There were very few students that reported not feeling responsible for the increase in garbage production in their community. This may suggest that the garbage project did not succeed in increasing the student’s

sense of environmental responsibility. On the other hand the garbage project might have increased the student's environmental awareness.

### ***Students' Suggestions for Project Improvement***

When asked "If you wanted to change something about the project what would that be and why?" almost every answer revolved around trying to get out of collecting and observing the garbage produced in their household every day. They suggested doing it once a week, or having the person who worked as a house keeper in their houses to observe it and separating it for them. After having a conversation with the researcher they all understood that it would not be suitable to measure the garbage weekly since it would spoil and it would not be sanitary. After understanding the reasons behind the instructions the students mentioned that they did not wish to change anything in the project, because they considered then everything they did necessary to understand it. However, they did not appear to be as excited about the continuation of the project as the 5<sup>th</sup> and 6<sup>th</sup> grade groups.

### **Staff and Teachers**

#### ✓Challenges and suggestions

Teachers and staff members were asked to mention the challenges that they encountered during the garbage project, and some of the answers were as follows:

*"...I feel a lot of them ... didn't actually do it, they might have done it for one or two days but a couple of them were like "oh! It's due tomorrow?!" and they came up with the project, so I was like "mmm?" (makes dubious face) because it was supposed to last 7 days, you know..."*,  
*"... If I had more time since it was the last trimester... I would've liked them to have a little bit more, but it was definitely a step stone to something bigger..."*

-Complete transcripts of the 7<sup>th</sup> grade teacher focus group video sessions available in Appendix 33

While these answers suggest that some of the students might have not been engaged or motivated by the activity the answers in the pre and post-test suggest that these students represent the minority. Teachers suggested having more time to dedicate to the project would be

beneficial and would allow room for more activities that would connect to the garbage project and help reinforce concepts.

During the discussion session with the teacher a greater underlying challenge was encountered. When asked the question “What is your perception of the interest or the support that the parents provided to the activity if any?” the answer revealed the following:

*“... (Makes disappointed face)... I actually felt a lack of support, more of antagonizing the situation...”, “... that it was not hygienic, there was actually one complaint that “la nana (the nanny) lo saca por la mañana” (takes it (garbage) out in the morning), she can’t wait till 2:30pm to take out the trash...”, “...I had a couple of challenges... I tried to plan a fieldtrip to go see a beach that is completely contaminated with trash and is not because anybody put it there is because the ocean current brought it... that was a mess, I had to cancel the trip, we had 30 parents calling, why are they going to Laguna Oviedo, why are they going to that trash place? What’s the point? ...”, “...I think that many people have the mentality that is not affecting me, is not affecting my kids, I don’t have the trash in my house so what do I care? I think that is at a much more ignorant level ... we see it (trash) all over the place, is a very, very big situation, and they don’t see it, they don’t see the importance behind it...”, “...perhaps we should hold a seminar, but then again, we hold a seminar, and out of 300-400 parents, only 3 or 4 show up, so I mean it is important to provide the opportunity but I don’t know how to stress the importance of it...”*

These answers provided more insight into the reasons that may have caused students to not be interested or engaged in the activity. Parents were not in agreement with the garbage project. They appeared to not have seen the point or final objective of the project, even after the letter we sent home and the discussion with the teacher at the open house in the beginning of the school year. The project took place almost at the end of the school year during the final months of May and June. The lapse in time between the communication with the parents and the project could have caused parents to forget what the project was about, or that it was taking place. Parents’ unwillingness to cooperate resulted in cancelled activities. These activities were planned by the teacher to enrich the project. This included a trip to a recycling facility and a trip to a contaminated beach. It was concluded that getting the parents on board with the garbage project is critical for future years.

A suggestion made by the teacher was to include more activities in the unit to tie into the garbage project. Some of the activities suggested were assisting with the collection of recyclables



at school, a school trip to a recycling facility and/or a visit to a landfill. Inviting parents to join the students in the activities would help them understand the importance of the project and would aid with student engagement and motivation.

✓ Overall perception and future of the project

The garbage project was considered by staff members and teachers to be a positive activity and a stepping stone towards a more environmentally conscious school. However, students and parents did not share this perception about the project. Students did mention in the focus groups that they thought the activity should be continued on future school years. However, this more likely does not represent the parents opinion since approximately only half of the class was granted consent to participate in the discussion sessions.

During the next school year the Community for Learning has already decided to host a 7<sup>th</sup>-12<sup>th</sup> grade Science Fair with all environmental projects. The teacher hopes that, by getting the parents involved and stressing the importance of the garbage project and the other activities she has planned to complement it, she will be able to gain their support.

## **8<sup>th</sup> Grade: The Energy Audit Project**

### **Pre and Post Tests Qualitative Analysis**

The energy audit project started at the beginning of the school year with the objective to introduce and/or reinforce students' concepts of energy auditing and energy saving practices. In the pre-tests we asked students the question: "Are you familiar with what an energy audit is?" and the vast majority answered positively. With this we learned that pre- tests had been administered after the activity had begun therefore some of our data from the pre-test was compromised. In the pre-tests we also asked students to "please mention some examples on how we can save energy at home or at school" and some of the answers were as follows:

*"...turn off lights and TV when not using them...", "...turn off the light and fan when you step out of a room...", "...take 2 to 5 min in the shower...", "...disconnect things from the wall when you're not using them...", "...turning lights, fans, water off when not in use, and when not*

*using the computer too...”, “...turning lights and fan off when no one is around...”, “...not charging your computer each 10 seconds...”, “...taking off the plugs when don’t need them...”, “...turning off lights and everything that involves electricity...”, “...turn off lights, use less air conditioner, don’t leave the freezer door open...”, “...don’t use too many things at the same time...”, “...use low consuming light bulbs...”, “...always turn things off when not using them...”*

These answers suggested that at the time of the pretest students had a clear idea of some of the ways that they can save energy at home and at school. Because the pre-tests were administered after the activity had begun there is no guarantee that this knowledge wasn’t acquired during the activity. In the pre-tests students were also asked “Do you already practice saving energy at home? Why yes or no?” The majority of their answers were positive. Some of the reasons provided by the students were as follows:

*“...we would pay less amount of money and because it’s better for the environment...”, “...because we have to lower our energy bill and aid global warming ...”, “...because the electricity bill isn’t cheap...”, “...because my mom is like eco-friendly and she likes to save energy and stuff...”, “...because that way we don’t waste money and kill Earth...”, “...by saving energy, you’re saving yourself money for energy bills and it is good for the environment...”, “...I think is important to save and because my dad demands that I do it...”, “...because my parents complain about the electricity bill always, and also because I care about the environment...”, “...I think we have to save energy to contribute with the world. We need to help with not contaminating the Earth where we leave in...”, “...because the electricity bill at my house is really high and my dad tells me to save energy, and I have to help the environment...”, “...because my parents always bother me with turning off lights and they always let all the lights on and the TV on when they leave the house, and I try to save energy so I could scold them...”, “... My dad says it’s important because the bill is quite expensive...”, “because the electricity bill can be high...”*

These answers suggested that the main reason to save energy at home or at school is to save money either because the bill is expensive or because their parents tell them to for the same reason. There were only a small number of students who mentioned that it was good for the environment. No student went further by explaining what this meant and how they were connected. The students who answered negatively to this same question acknowledged doing so because most of the times they just forgot to follow the measures described to save energy.

In order to see if we could observe an increase or change in knowledge gain, and also to detect any possible change in behavior by the end of the activity we turned to the data collected

from the students in the post-tests. However, while going through the post-tests we found that these were administered at the end of the school year and not at the end of the activity. Several months had passed after the end of the energy audit activity by the time the post-tests were administered. This could have compromised the quality of the responses provided by the students because of the long lapse in time between the end of the project and the post test.

To assess the level of knowledge gained through the energy audit project, students were asked in the post-tests the question “what are some of the benefits to the environment of saving energy at home or at school?” Some of the answers were as follows:

*“...less contamination...”, “...the more we save energy there is less global warming...”, “...you save more money...”, “...you’re saving animals, the ozone layer, environment...”, “...the planet is more green...”, “...we waste less money and less energy, which benefits the environment...”, “...we save money, therefore, we save trees...”, “...less gasoline is taken from the ground...”, “...trees don’t die, no pollution...”, “...less fuel is used to produce light...”, “...you can help the world, save animals and teaching others...”, “...it reduces pollution and helps the planet...”, “...you get to make the school and the world greener...”*

These answers suggested that students were not very clear on what the possible environmental benefits of performing an energy audit. They mentioned less contamination, less global warming, helping the planet, all of these answers are very vague for the 8<sup>th</sup> grade age level.

To see if students had changed their perception about the environmental importance of saving energy at home and at school students were asked again in the post-tests “Do you already practice saving energy at home? Why yes or no?” We were looking to see if their reasons after the activity had changed from the economic stand point towards the environmental. Some of the answers were as follows:

*“...because it saves the environment, and money...”, “...because it helps the world around us and its better us and there is always my dada to remind me...”, “...because you need to save the environment, and it is saved by saving light...”, “...because I like to save the planet...”, “...because then my family wastes less money and energy, and the less energy we waste the more it benefits the world...”, “...I just started becoming more conscious about whether or not I left my light on and I do it so that I save energy and money...”, “...I think we need to respect the environment and the money in our parents’ pockets, it’s just important for the world I guess not that I save so much energy but I try my best...”, “...seriously, honestly because*

*my dad tells me to do it...”, “...because I’ve learned that to save energy is important to keep the world green...”, “... because if the I don’t save energy, the bill will get high and I won’t be allowed to turn on my AC...”, “...because when we did the project I noticed that we waste a lot of energy doing stupid things like not turning off the lights when we leave the room, etc...”, “...yes because I save money...”*

These answers showed that even though many students mentioned wanting to save the planet, and being more conscious about saving energy, overall the major motivations to save energy at home were to save money and because their parents have advised them to do it. This suggested that even though it appeared to be a slight increase in environmental awareness parents play an important role in the students’ motivation to save energy. It is also, important to mention that more students participated in the pre-tests than in the post –tests. There appeared to be no particular motive behind the lack of interest in participation towards the end of the project and this group had the lowest rate of participation in the focus group sessions out of the four groups, approximately a third of all 8<sup>th</sup> grade had consent to participate in the focus group sessions.

## **Skype™ Focus Groups Interviews**

### ***Links between Energy Production and Consumption and its Environmental Impacts***

In the focus group session we asked the students “how do you think energy production and consumption affect the environment? How do we affect the environment when we consume energy or when we produce energy?” These questions were intended to help us see if the students were able to make the connection between energy consumption and the detrimental environmental impacts that it can bring. Some of the answers were as follows:

*“when we are producing or consuming energy, both of them I don’t think that we do well, we waste a lot of it, and because the energy that we’re getting is not like we’re getting it from the air, we’re sort of destroying the environment, we need it, but we’re constantly wasting it...”, “...energy comes from generators, and when you’re building a generator you’re probably causing pollution, and to get energy the generators are far away from town so I don’t know you need to throw down some trees or something probably? (seems dubious of last part)...”, “...I think that using a generator we are creating a lot of pollution because we were taught energy is not created out of nowhere it can only be transformed, so we need to take things from the environment and create an electrical current...”, “...I don’t know... maybe in the process of converting oil into fuel we use chemicals that aren’t good for the environment, I don’t know...”, “...when we take oil from the ground it can spill all over and damage the world, water can get*

*dirty, and the environment too...”, “... I think that when we burn fuel, fumes and things are released into the air...”*

-A complete transcript of the 8<sup>th</sup> grade focus group video session available in Appendix 29

These answers suggest that students do have an idea about how energy is produced, however; they are not too sure about what they know. Overall this answer suggest that students have a superfluous knowledge about the environmental impacts of producing and consuming energy, being below grade level for 8<sup>th</sup> grade.

Students were asked “do you think that reducing the energy bill or reducing fuel consumption, at home or at school can be good for the environment?”, to see if we were able to get more complete answers than the ones collected in the post-tests. We wanted to see the quality of the answers provided by the students orally to see if we could identify an increase in students’ knowledge since the beginning of the energy audit project. Some of the answers were as follows:

*“...I think that yes it would have a positive effect on the environment because I think every little thing you do can help...”, “...let’s say that we do those things like turn off the lights and stuff, then other people, more people, will want to do that same thing, and people might start taking care of the environment , and turning off the lights too and that helps...”, “...I think mainly we could start to create a greater change, like among our houses, and school, I mean at school what are we like 400 people? We could talk to our parents and our parents talk to other people, and it would go and go, and it would be better...”*

Looking at these answers we saw that in the focus groups the students did not provide any more insight about how saving energy or reducing fuel consumption can be good for the environment. This suggests that the knowledge gained did not go beyond what they knew at the time of the post-tests and it was not at the 8<sup>th</sup> grade level.

### ***Change of Mind about Saving Energy after the Energy Audit Project***

During the focus group session we wanted to know if the energy audit project had changed the attitude that students displayed towards practicing energy saving techniques at

home. We asked the students “Did the energy project change your mind about the way you and your family consume energy and fuel? How?” Some of the answers were as follows:

*“...yes, after the project I actually told my parents to change the incandescent lights for fluorescent lights, and I started turning off the lights in the night because I never did; now I do...”, “... Yes, after we built the graph about the estimate price that my team paid for I was really surprised and when I got home I started saying to turn off the lights, and every time I went out of my room I turn off the lights...”, “...Before, I had this crazy theory that even if my phone was completely charged, I charged it more it would get more energy and last longer, I did that with my video games and my laptop, after I found out there’s no difference I started unplugging and taking it off the plugs...”, “...I think that after the project, everyone in school, I mean a lot of people did start turning off things lights and taking more care of the environment...”, “... my computer always would be connected, so actually leaving your computer connected for one week actually damages it so now my computer only lasts 20 min without a charger...”, “... I used to lock myself up in my room with the AC on the whole day, and now I only turn it on at night, so the bill did go down a lot after I stopped...”*

These answers showed us that not only did the project make students change their way of thinking by becoming more conscious of their energy consuming habits, but motivated them to take action.

### ***Students’ Suggestions for Project Improvement***

In the focus group session we asked the students “If you could change one thing about the way we did the project what would that be and why?” Some of the students’ suggestions were as follows:

*“...I think that it needs to be a little bit more organized because we were working in five groups and we had to count lights, and I think we need more people, like more classrooms, I think it will turn out better if 9<sup>th</sup> grade worked with 10<sup>th</sup> grade, and we needed more time...”, “... Is not more class time, is that this time it was new to us and we weren’t introduced to the topic before, and we didn’t really know the information that we needed to collect when doing the audit...”, “...we counted and then we had to wait a week to work on the project again so ....I think it would have been better to do it constantly I think in one stop...”, “...I think that when 8<sup>th</sup> grade does this next year they should include more people and not only their parents , like every grade should do something about it, both the environment and the energy issues so that everybody in the school would be aware of what’s going on, maybe like a school campaign...”*

These answers bring back recurrent suggestions seen in some of the other projects, such as dedicating more time to the project, including more people to participate in the project and developing an educational campaign for the school to spread the knowledge. These suggestions gave the impression that students were motivated by the project enough to want to share it. However, it would be wise to include parents in the activity as well. Including parents and having them participate with the students might increase students' attention and interest since most of them mentioned saving energy mostly because their parents had instructed them to for the purposes of reducing the energy bill at home. Tying the environmental benefits with the economic benefits could increase the activity's potential in the future.

### **Staff and Teachers**

#### ✓Challenges and suggestions

After speaking to the teacher and staff members we were able to have a much clearer picture of what the possible challenges for the energy audit activity were. When asked what they thought were the challenges for the energy audit activity some of the answers were as follows:

*"I think that ... I should've waited till the very end and give it when it was supposed to, I think they (students) would've had much more to work with, plus much more experience, basically doing science... these kids is like the first time they see things like units (measurements) and if you rush them into it they don't get a full comprehension of exactly what they're doing...", "... you can imagine doing an energy audit in a place where there is no stable energy source, that itself was the beginning of the problem...", "...I presented it (the results) to (staff member) and I don't know she felt like it was going to be a lot of work for the people who are taking care of that right, I don't know, I guess she didn't have the foresight to see that she might have actually extracted some information and be able to save money, you know...", "...I think that what we really need is a little bit more organization in terms of collecting the data, they (staff members) should have charts prepared for the generator, when is it on, for how much time, how much gasoline was bought, when?... they should have an average of what the fuel consumption is, they should be able to say how many KW-h can you run until you have to do it again, they don't know that yet...", "...and if kids have suggestions regarding their findings and they should follow up on it, they have more interest and I feel that in this project that didn't happen (speaks Spanish), in the garden they had the kids running around and they had everything, but when it came to the energy it was stop, and wait type of thing..."*

-A complete transcript of the 8<sup>th</sup> grade teacher focus group video session available in Appendix 34

These answers suggested that there was a miscommunication between a staff member and the science teacher who implemented the project. The teacher felt that the suggestions for improvement were not followed up, and that might have discouraged the students. This may have been especially the case after seeing all the many things that were done for the garden and composting projects. Starting the energy audit later during the school year and not in the beginning was also suggested, since it would facilitate the way the students performed their calculations and built their graphs because they would have more experience with lab experiments and that would benefit them when doing the project.

Since this group had the lowest return rate of parental consent forms out of all the grades we wanted to see what the teacher's perception was about the parents' support during the activity? Some of the comments were as follows:

*“...I want to say that the parents that I got to speak to, they were very surprised that I had them running around doing this, some of them were like “I’m so glad that you did this it helped me out a lot”..”, “...we went over their (students’) energy bills and some of these parents are paying over 100,000 pesos (>US \$2,500), alright? Maybe that’s part of the reason, it’s a bit excessive! This people have central AC, water heaters, pool, ect... all the time! ... Nobody wants to divulge their excesses! ... they’re wasting like 5 people’s regular salary on it!... I won’t confirm it, but in all likelihood that is what’s going on! ...”*

The possibility that parents could have feared that their children would disclose personal family expenses in a video conference might have caused them to deny consent to participate in the focus group sessions, regardless of the anonymity clause in the document. In order to tackle this for future school years, and reduce the number of unsigned consent forms, when asking students for their energy bill from home to analyze in school, the teacher should ask them to remove any information that can make the bill identifiable, and then proceed to place them in a receptacle. Then students would draw an energy bill to analyze at random. Also, emphasizing the anonymity of the documents that would be brought in at the beginning of the school year could help.



✓ Overall perception and future of the project

Overall the teachers and staff members had a positive perception about the project and hoped that it would continue in the future. For the future, it is important to take into account the students' suggestions at the end of the activity, and being more organized as a way to facilitate the data collection process in the beginning of the activity. The teacher also suggested meeting with the staff in charge of fueling the generators and turning them on and off to train them and explain the process of keeping a log of the hours of operation and fuel consumption. This would make the students' lives easier when collecting data and would paint a clearer picture of what the total fuel consumption is. This would make it easier to devise a plan to reduce it.

Including visits to local generating plants and the Dominican Electricity Enterprises could also reinforce the lesson plan. For the future, a visit to the Dominican Petroleum Refinery could help students understand how fuel is produced. At the same time finding local agencies that work with alternative energy sources would enrich the activity. Finding support and time to connect these possible activities in the curricula might be the most challenging part.

## Discussion: Quantitative Analyses

**Table 1: Participation Data Summary for all Projects**

Grade	Project	TS	PSPT	PSPT /F	%F	PSPT /M	%M	PS	PS/ F	%F	PS/ M	%M	%PS	%PSPT
5 <sup>th</sup>	Composting	36	34	19	55.9	15	44.1	22	15	68.2	7	31.8	61.11	94.44
6 <sup>th</sup>	School Garden	33	28	11	39.3	17	60.7	23	8	34.8	15	65.2	69.70	84.85
7 <sup>th</sup>	Garbage	32	27	17	63.0	10	37.0	11	10	90.9	1	9.1	34.38	84.38
8 <sup>th</sup>	Energy Audit	23	14	9	64.3	5	35.7	7	7	100	0	0	30.43	60.87

TS= Total students in grade

PSPT= Participating students in pre and post tests

PSPT/F= Participating female students in pre and post tests

PSPT/M= Participating male students in pre and post tests

PS= Participating students in Skype focus groups

PS/F= Participating female students in Skype focus groups

PS/M= Participating male students in Skype focus groups

%PS= % of participating students in Skype focus groups

%PSPT= % of participating students in pre and post tests

From Table 1 we can observe that student participation was significantly higher than 50% for the pre and post-tests for all projects ranging from slightly over 60% to more than 94%. However, the student participation decreased significantly for the Skype focus groups from 30% to a little over 61%. Overall, student participation appears to decrease with grade level, the higher the grade the lower the percentage of student participation in both pre and post tests and focus groups interviews. Further, we can observe that there was a higher percentage of female student participation in all grades with exception of 6<sup>th</sup> grade.

For all the activities there appeared to be a general trend that participating female students seemed to have had a better performance in terms of knowledge than participating male students. However, these differences were not statistically significant as the different tests revealed. Performing a longitudinal study at TCFL would assist to further evaluate this possible trend. This same longitudinal study could also reveal changes in knowledge gain and perception of the activities as students who have participated in the grades 5 and 6 projects, undertake the grade 7 and 8 projects.

## 5<sup>th</sup> Grade: Composting Project

**Table 2: Answer Summary of Pre & Post Tests (Yes & No)**

Question	Heard about Composting before the activity?				Do you think composting can reduce waste?			
	F		M		F		M	
Answer	Y	N	Y	N	Y	N	Y	N
	7	12	2	13	12	5	10	5
%	36.8	63.2	13.3	86.7	70.6	29.4	66.7	33.3
<b>Total</b>	<b>19</b>		<b>15</b>		<b>17*</b>		<b>15</b>	
<b>Obs</b>	-				*2 F did not answer			

**Table 2 (cont): Answer Summary of Pre & Post Tests (Yes & No)**

Question	Willing to try composting before the activity?				Willing to try composting after the activity?			
	F		M		F		M	
Answer	Y	N	Y	N	Y	N	Y	N
	18	1	13	2	18	1	14	1
%	94.7	5.3	86.7	13.3	94.7	5.3	93.3	6.7
<b>Total</b>	<b>19</b>		<b>15</b>		<b>19</b>		<b>15</b>	
<b>Obs</b>	-				-			

Even though all the Chi Square tests performed in the quantitative analysis suggest that there is not a difference of answers based on the gender of the participant students; the breakdown of the data provided by the table above allows us to see the opinions of both female and male participants. However; it appears that slightly more females had heard about composting before the activity started than males. Also, it appears to be little change when the students were asked if they would be willing to compost, since before and after rendered the same results. It should also be noted that all students, but one of each of gender, were willing to try composting at home after the activity was over. These results, in combination with the results obtained from the confidence interval with the data gathered from the Skype focus group session, suggest that overall the composting activity had a positive impact on the 5<sup>th</sup> grade student population of the Community for Learning School.

## 6<sup>th</sup> Grade: School Garden Project

**Table 3: Answer Summary of Pre Tests (Yes & No)**

Question	Heard about what a School Garden is before?				Do you think a School Garden helps fight poverty?				Do you think a School Garden is good for the Environment?			
	F		M		F		M		F		M	
Answer	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
	9	2	14	3	11	0	17	0	11	0	16	1
%	81.8	18.2	82.4	17.6	100	-	100	-	100	-	94.1	5.9
<b>Total</b>	<b>11</b>		<b>17</b>		<b>11</b>		<b>17</b>		<b>11</b>		<b>17</b>	
<b>Observations</b>	-				-				-			

Because the sample size for this group was very small we could not perform Chi square tests to see if there was a difference in the responses to the questions based on the gender of the students.

From Table 3 we can appreciate that 9/11 (0.818) of the females and 14/17 (0.823) of the males in the 6<sup>th</sup> grade had heard about what a school garden was. Also, 100% of all female and male students answered positively to the question “Do you think having a school garden could help fight poverty?”, and almost the same results for the question “Do you think that having a school garden is good for the environment?” Having this high proportion of yes responses, for all three questions suggests that the data might have been compromised in some way. By looking at the dates and the content in the pre-tests it was clear that the pre-tests were administered after the school garden project had begun, therefore giving the students knowledge about school gardens prior to receiving the pretests. This was also confirmed when going over the answers to another of the questions in the pretest; this question asked where the students had gained information about school gardens. Many answers were as follows:

*“...here in my school...”, “...In the school and we work with (names teacher and Gaby Flaquer)...”, “... In my school we are doing one...”, “...I heard about it in my school, by the project we are doing that’s with plants...”, “...With Gaby, the teacher that helps us on the garden, she explained about our garden, what we’re using it for ...”, “...When we started this project...”, “... I learned about school gardens in school...”*

Judging by these answers we can confirm that the pretests were given after the activity had begun therefore the data that was collected through the pretests do not assist us in

measuring the previous knowledge that the 6<sup>th</sup> grade students had about school gardens. However, even though the pre-tests were administered after the activity had begun; the students' knowledge was between poor and average. This suggested that students could still increase their knowledge after the activity was complete.

As for the post test results, for the school garden we will analyze the information by observing the bar graphs provided in the analysis. It appears that after the school garden activity the knowledge about school gardens had gone from poor and average, to average and good in most cases, with the participating female students providing more good answers than male students. However, we were not able to evaluate this difference statistically since the sample size was too small. When analyzing the level of knowledge about the environmental benefits of having a school garden, all answers provided were in the very poor to average category. The participating male students had a slightly higher proportion of average answers. However, even though the participating female students had a small proportion of category 4 answers (Good), both groups had significant category 2 (poor) answers suggesting little understanding of the environmental benefits of having a school or home garden. This may suggest the quality of the environmental knowledge gained through the project was not above average, and for many students, poor. However, we suspect that the nature of the pre and post tests may have influenced the results. The pretests were more structured and the questions were straight forward, while in the post test there were fewer questions and all of them open ended. We had hoped that the students would be able; after the activity was over, to provide more detailed responses, but this was not the case. This may suggest that open ended questions were not the best way to evaluate the level of knowledge gained.

When looking at the data gathered from the focus group Skype session and the confidence interval built using these data we can see that at a proportion of at least 0.19 of the participating students were motivated by the school garden project to start growing something at home. Even though the knowledge level of the environmental concepts associated with a school garden were not above average, the activity served as a catalyst to learn about environmentally friendly gardening practices, and show the students the purpose of an action project.

## 7<sup>th</sup> Grade: Garbage Project

**Table 4: Answer Summary of Pre & Post Tests (Yes & No)**

Question	Heard about Overpopulation before the activity?				Do you think Overpopulation increases waste production?				Should we reduce waste production? (asked prior activity)				Should we reduce waste production? (asked after activity)			
	F		M		F		M		F		M		F		M	
Answer	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
	17	0	8	2	15	2	9	1	16	1	10	0	17	0	10	0
%	100	-	80	20	88.2	11.8	90	10	94.1	5.9	100	-	100	-	100	-
<b>Total</b>	<b>17</b>		<b>10</b>		<b>17</b>		<b>10</b>		<b>17</b>		<b>10</b>		<b>17</b>		<b>10</b>	
<b>Observations</b>	-								-				-			

By looking at the data displayed in Table 4, we can observe that 100% of the participating female students had a previous knowledge about overpopulation before the garbage project started, and 8/10 (0.8) of the participating male students were also familiar with the overpopulation concepts before the garbage project. By looking at the responses to the other three questions we can see that the proportions of positive answers for all questions ranges from 0.9 to 1. This appears to be the same situation as the previous grade in which all the data seems to have been compromised in some way.

Turning to the content of the pre and posttests to determine in what way the data was compromised we noticed that in fact many students mentioned having talked about and learned about overpopulation in other classes at school, from the media, or family members. Many of the answers were as follows:

*“...here in the Social Studies class...”, “...in some school classes...”, “...in L.A. class an essay about the one child policy in China...”, “...in Math doing density...”, “...when I was learning about poverty (6<sup>th</sup> grade)...”, “...in Math, but it was finding the density of certain areas and countries...”, “...I have learned about it seeing the news...”, “...in ads, the Discovery Channel, and Math...”, “...from the home page of MSN there was an article of overpopulation...”, “...from Science class, and my sister has talked about it...”, “...in school and my grandparents...”, “...in Social Studies and from my family...”*

Judging by these answers we can confirm that the students did have prior knowledge about overpopulation before the Garbage project was implemented; therefore the data appears to be legitimate and not biased. By looking at the bar graphs from the quantitative analyses we get a

sense of the level of knowledge the students had about overpopulation before the activity began, and after it was finished. In these graphs we can see that while there were female students who provided answers in the good and great categories both before and after the garbage project, there also appears to be an increase in the proportion of female students that provided average responses, and an increase in the male students that provided average responses. This may suggest knowledge gain regarding the concept of overpopulation. Also, the participating male students did not provide answers beyond average, suggesting that the level of knowledge gained after the garbage project was only sufficient for the grade level. We think that the nature of the pretest and posttest questions might have influenced the quality of the answers as described for the previous garden project and this could be one of the reasons for the low knowledge gain perceived.

When looking at the data gathered from the focus group Skype session, and the confidence interval built using these data we can see that at a proportion of at least 0.59 of the participating students were motivated by the activity to change the way they and/or their families disposed of solid waste or garbage after participating in the activity. This suggests that the garbage project had a positive impact on the students' lives causing many of them to change in some manner the way they disposed of garbage.

### **8<sup>th</sup> Grade: Energy Audit Project**

**Table 5: Answer Summary of Pre & Post Tests (Yes & No)**

Question	Have you heard about Energy Audits before the activity?				Do you try to save energy at home? (asked prior to activity)				Do you try to save energy at home? (asked after activity)			
	F		M		F		M		F		M	
Answer	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
	9	0	4	1	7	2	5	0	9	0	5	0
%	100	-	80	20	77.8	22.2	100	-	100	-	100	-
<b>Total</b>	<b>9</b>		<b>5</b>		<b>9</b>		<b>5</b>		<b>9</b>		<b>5</b>	
<b>Observations</b>	-				-				-			

By looking at the data in table 5 we can see that 100% of the female participants and 80% of the male participants had heard or learned about energy audits before and stated so on the pretests. We again wanted to see if the data had been compromised in any way by determining

where they had gained knowledge about energy audits before the activity. Many of the answers were as follows:

*“...In school, in Dennis (Science teacher’s name) classroom...”, “...I learned about it in Science class with Dennis...”, “...Science class, in school...”, “... at school, in science class during the energy unit...”, “.... I learned it in Science class...”*

These answers suggest that in fact the data from the pre-tests was compromised since these were administered after the energy audit project had begun. This is also confirmed by the date on which the pretests were administered (October 5<sup>th</sup> 2011) when the energy audit began weeks before during the month of September. However, even though students had heard about what an energy audit was before the activity, the knowledge level about the concept among male and female participants was spread mostly between the very poor to average category responses. This suggests that the students didn’t have sufficient knowledge about energy audits according to their grade level. When looking at the bar graphs of the level of knowledge after the energy audit activity had been implemented we can see that some improvement was attained by both participating male and female students. However; a proportion of participating male student still provided answers in the poor category. We have to consider the possibility of the structure of the post-test presenting a challenge which might have affected the results due to the same reasons as in the other projects. Another possibility is the fact that the post tests were administered too far from the end date of the project. Based on the dates of the post-tests these were administered in the month of May 2012 when the project ended in November 2011. This lapse in time might be the cause of the perceivable small knowledge gain regarding the concepts of the energy audit project among the students.



### **Discussion: Qualitative Analysis**

After taking a thorough look at the qualitative data collected through the pre and post-tests, as well as the Skype focus group sessions with students, staff, and teachers we can say that all the activities were perceived in a positive light. The garden project and the composting activity probably had the most significant impacts on the school's teachers, students and parents of each grade level. This may be because both of these activities took place in the school yard. Both the garden and composting project included education campaigns. The composting project reached out to the student body to assist with properly disposing of their lunch and school garbage. At the same time, the garden project sought the student's body support to care and look out for the school garden.

During the focus groups conversations several themes, challenges, and suggestions for improvement were common to the four activities. We will discuss each one of these factors in an attempt to better analyze, synthesize, and organize the information obtained.

### **Green Culture at the Community for Learning**

When interviewed, staff members mentioned that a green culture had started to spread at school with the implementation of the activities. They mentioned that other teachers had been motivated to take on a similar approach and 4<sup>th</sup> grade was in charge of collecting recyclable materials, such as cardboard boxes and plastic bottles, to be picked up at the school by a local recycling agency in Santo Domingo, called Green Love. Also, the school lunch facility decided to go Styrofoam free and now uses reusable, and washable plastic trays, as a way to reduce solid waste.

Teachers and staff members mentioned that students in the 4<sup>th</sup> grade are looking forward to participate in the composting project when in 5<sup>th</sup> grade, and that 5<sup>th</sup> grade students were looking forward to working in the school garden when in 6<sup>th</sup> grade. Staff and teachers couldn't say the same about 6<sup>th</sup> grade students wanting to work in the garbage project or about 7<sup>th</sup> grade students wanting to work on the energy project. However, this could have been because both of these projects were less advertised in the school environment, and also their work took place

mostly in the students' homes. It would be advisable to look for ways to expose both of these activities more to the school population to try to expand the students' excitement toward these activities as well.

The school has made the decision to make the environment the focus of the next school year's science fair for grades 7 through 12. Further, the school decided to build an outside classroom. This will provide students with a regular meeting and work place for projects which are outdoors. The outside classroom was completed during the summer and is already being used.

Teachers that were not involved directly with any of the activities participated in the projects by cooperating with the proper disposal of the garbage to assist with the recycling in 4<sup>th</sup> grade and the composting in 5<sup>th</sup> grade. Many teachers and students volunteered to help with the initial set up of the school garden and to look after it if there was the need. Teachers, staff members and parents bought the produce that the garden yielded to show their support. To complete the connection with the poverty theme students shared their experience and knowledge of the garden with Aldeas Infantiles (See below). Staff members, teachers, and students all spread the word and suggested it to other friends, and schools.

All of the before mentioned facts strongly suggest that the activities, some more than others, had a positive impact in the school environment and school population in general. These activities have the potential to create environmental awareness throughout and beyond the school.

### **The Garden Project: Community Building & Aldeas Infantiles**

Even though the garden project was not very successful in terms of students learning about the environmental benefits of having a school garden or small home garden, staff and teachers agree that it was great for building a more robust school community. Students confirmed this in their focus group sessions in which they reported having enjoyed working together in groups and getting their hands dirty. Teachers also mentioned using the project as a vehicle to build student-teacher relationships and to become familiar with their groups.

Since the garden project was designed to connect with the poverty theme in the 6<sup>th</sup> grade curricula, the original idea was to sell the produce to the community surrounding the school at a lesser price than the local super market. However, the school decided to share the garden project with Aldeas Infantiles (AI). AI is a local organization that provides the basic necessities to foster parents and their children. AI is an enclosed community in which foster parents receive help to take care of children in need. They are given a modest house in which many children are assigned to a foster mother, and provided with education and health assistance. This community has an organized structure and the enclosed facility provides security for the students to share with the other children without being concerned for their safety. The staff at AI received the group of teachers and students and had a morning of sharing their garden experience. In the future, the two communities would share best practices. AI also expressed interest in starting to make their own compost. Sharing the garden project with AI helped the students to see the benefits of a home and school garden for the community. The future ongoing exchange of gardening experiences among AI and the school will ensure a solid connection between the garden and the poverty theme.

### **Suggestions for the Future**

- ✓ Not Enough Space: Composting and Gardening in Small Places

The main problem mentioned by students, teachers, and staff members trying to compost or garden at home was not having enough space. Targeting this issue in the lesson plans of both activities can help with the misconceptions created by doing the garden and the composting activities at a large scale. Showing examples of how to compost in an apartment using small composting bins and plastic containers can show how inexpensive it is and how little time it requires. Providing examples of roof top, vertical, and stacking gardens to take advantage of sunlight and grow edible plants at home will help to address this perceived problem.

It is very important to address these issues in the lesson plans due to the fact that Santo Domingo is a densely populated city with mostly vertical growth of apartment complexes. Green spaces are limited in apartment and housing complexes. If we really want to help students grow produce at home we must provide them with the knowledge to do so with the resources they

have available. Contacting local experts to help and assist with demonstrations and information at the school should help, but actually having the children trying to grow in small places in school can help troubleshoot problems and questions that they may come across before trying it out on their own at home.

✓ Cemented Front & Back Yards: How to make it work

Another reason mentioned mostly by students, and some teachers for not gardening or composting at home was having a cement front or back yard. Unfortunately it is becoming a growing trend in the city to pour concrete or place tiles over green spaces to use as parking places, expand living quarters, or avoid maintenance of green space. Informal urban expansion is largely unregulated in the vast majority of the Santo Domingo area. Only historical and/or cultural areas have strict regulations enforced about new construction, façade changes and green space.

With this challenge we have to take the same approach as with the garden project before. We need to provide examples of how to make the concrete floors less challenging when trying to grow vegetables or even trying composting. Raised beds or pots could be helpful for planting in this particular situation and composting can be done regardless of the cement or tile because it won't damage it if done in an appropriate container. There are many do-it-yourself options available online so families don't necessarily have to purchase one. For both of these challenges there is a website that provides easy to read articles with "how to" information about growing vegetables in small and large places, as well as composting. The website is called Grow the Planet and there is no subscription fee and it provides access to post comments and receive advice and suggestions from other growers that may have experience with a certain issue. The exchange of information can be helpful to plan small lessons with the articles, and try tips for improving the experience, and it is available for parents and teachers to read and try on their own time.

- ✓ Why garbage?: Dealing with parents' and students' negative attitude towards the Garbage Project

During the focus group sessions with students and the teacher we discovered that this project had had considerably less popularity than the composting and the school garden projects. While in the conversations with the students we noticed that all the majority of suggestions made were addressed at reducing the number of observations to once or twice a week. The teacher planned the Population Dynamics theme around the garbage project, and because of the parents' unwillingness to support the extra activities that she had planned, like a visit to a contaminated beach called "Playa Mosquera" the garbage project didn't have the impact we had hoped for.

The teacher and the staff members agreed that stressing the importance of the project at the beginning of the school year is very important to gaining parents' support. Sending a letter to the parents as a reminder of the activity and its purpose right before starting the garbage project is another way to increase parents' support. The teacher also suggested adding supplemental activities to the project such as visiting a recycling facility, a landfill, and requiring students to assist with the collection of recyclable materials going on in 4<sup>th</sup> grade. This would extend the impact of the activity and help open the students' eyes a bit more to the reality of the many recycling processes available in the Dominican Republic. It may help them understand that recycling is not a panacea, since these processes consume energy and may produce pollutants that harm the environment.

Including more activities to help students gain awareness that we are all responsible for the amount of garbage and waste we produce would also be helpful. One way or another, all of the waste ends up in the environment. There is a well-planned unit from Facing the Future titled: "Buy, Use, Toss? A closer look at the things we buy" that can provide helpful activities and make life easier for the teacher in terms of lesson planning. This unit is free for teachers after signing a non-commercialization or reproduction agreement.

- ✓ Too Much Information: Issues with Divulging Excessive Energy Consumption in the Energy Audit

The 8<sup>th</sup> grade only had one focus group session due to the lack of signed parental consents. After going through the focus group session with the few participating students, and looking at the students' responses in both pre and post-tests we could observe that students were mainly concerned about saving energy because they wanted to lower their home's energy bill, or because their parents had told them to do so for the same reason. Even though the students who were interviewed were found to be more conscious about their energy use after the project, they stated having changed their consumption patterns mainly because they wanted to reduce the price on the bill and the environment came in a second place.

During the discussion with the 8<sup>th</sup> grade Science teacher he stated that while in the project students had to bring a copy from the most recent energy bill they could have access to. The teacher reported having received and reviewed with students' bills that amounted to over US\$ 2,000.00 per month, acknowledging this a terrible excess. He suggested that being one of the issues that impaired us from obtaining a higher number of parental consent documents. Parents might have thought students were going to be asked questions about their bills again, which was not the case. Following the procedure described in the suggestion section of the energy audit qualitative analysis can help decrease the fear of divulging unwanted information by making the energy bills analyzed in the classroom anonymous. If the students remove all information from the bills and deposit them in a receptacle there anonymity can be accomplished. Also, finding a way for parents to participate in the activities of the energy audit project can help in making them feel more comfortable with their children's participation in the project. Reinforcing the environmental benefits of saving energy through the activity, for both parents and students, is vital to shift the results from mostly an economic stand point to a more environmental focus.

## Lessons Learned

From this first attempt to integrate ESD and ES into the curricula of middle school grades in The Community for Learning School there are many lessons learned. These lessons need to be taken into account when continuing with the activities to increase their success.

- a. The post test questions were too open-ended. In order to appreciate and better compare before and after the activities, the post-tests need to be redesigned to have more structured questions like the pre-tests.
- b. The garbage project may need to be redesigned as an in-school activity. As a way to maximize student participation and perform the activity in a controlled environment the garbage project should be planned as an activity to do in school under the supervision of a teacher in a series of class sessions. These sessions could include garbology using school garbage, or a teacher volunteer to bring garbage from home. Also, photo or video documentation should be included in the lesson plan since it can be used to improve analysis and reflection with the group.
- c. Anonymity concerns need to be addressed was in the Energy Audit project. To make sure no information is identifiable from energy bills. The teacher needs to create and provide a student protocol on how to bring in their energy bills without any traceable information linking the bills to the students. This will ease the parents' fears about divulging consumption excesses.
- d. Teacher training and supervision is needed throughout the activities. Even though The Community for Learning has educated and trained teachers, all of the teachers felt like they needed more training and support with the activities they were guiding. Having a trained person to oversee the progress of all projects is necessary to keep the staff feeling prepared and supported through the process.

## Conclusion

At the end of the projects we can state that both the school garden activity and composting project improved student's motivation to work in groups, and left a positive view on both of these environmentally friendly practices. Positive change in attitudes was perceived in the participants; however, the knowledge gain about the environmental benefits of both activities was not as expected. We understand that the modification of the lesson plans to integrate the suggestions provided by teachers, students, staff members and researcher must take place in order to achieve better results in the future. Composting and gardening motivated some students to try and replicate these activities at home, ultimately spreading knowledge and sharing the experience with others.

For all the activities it would be necessary to reformulate the post –tests. By redesigning them to have more structured questions and resemble the pre-tests we would hope to minimize the effect that the open ended questions might have had in the quality of the answers provided in the present study. When these activities are used in the future, we must try to minimize and control nonresponsive bias in the data collection processes, as well as obtaining parents input about their perception. While it might make the data collection process more extensive for the researcher, sending written surveys home with the students might help with gaining input from the parents.

Throughout all of the Skype focus group sessions, an increase in environmental awareness was recorded for the activities to some degrees. However, for the garbage project and the energy audit, the behavioral and attitude change after both activities was perceived to be minor. This could be explained by the small number of participating students, as a result of the lack of parental consent. Finding ways to increase parental consent for both of these activities is vital for their future success.

Overall, all of the activities were identified as positive for the school and the grade levels. Teachers, staff members, and students agreed that they should be continued in future years. This perception alone makes them successful. Continuing with them in the future would help increase the sample sizes and make the quantitative analyses more reliable, as well as provide more insight for the qualitative analyses.



### **Future Research Opportunities**

These activities or similar projects can be implemented at different schools in the Dominican Republic. Modifying the lesson plans to fit other schools is key in order to encourage broader use of the activities. It is important that the activities fit the needs and curricula of the school in which they would be implemented. Presenting the results of these activities to government officials at the Ministry of Environment and the Ministry of Education can increase our chances at getting better opportunities for implementation in public schools with public funding.

To implement this pilot project in the schools of the public system some challenges need to be addressed. The presented didactic materials need to be translated and adapted to be used in schools with much less economic and human resources. Teachers would require training and support when guiding the activities. These challenges can be overcome by having exchange and training sessions between the Community for Learning teachers and teachers from public schools. Having a small scale training program and applying the pilot project one public school at a time can help spread the knowledge without making it hard to maintain.

Implementing the composting and garden projects in rural areas of the DR could help us determine if changing the setting of the activities to another location that enhanced the possibilities of having more available room to grow vegetables and compost would actually make students try it at home. Also, many rural areas are in greater contact with the agricultural system which can help increase exposure to gardening and farming practices, offering different learning opportunities through the possibility of a direct experience.

Studies suggest that children that participate in a school garden show a general improvement in their academic performance in science and behavior (Blair, 2009; Lieberman & Hoodie, 1998; Rahm, 2002). In order to determine if this is the case for the students who participate in the school garden project we could expose one of the two 6<sup>th</sup> grade groups to the garden, while keeping the other group as a control. At the end of the school year we could compare the academic performance of both student groups in the main class subjects and test to see if there are statistical differences in the academic performance of each student. Data collection for this experiment should happen in the same school, for as many years as possible in order to overcome the difficulties of working with small samples

## Appendix 1

### 5<sup>th</sup> Grade Composting Activity

**Main Objective:** This lesson is intended to introduce the students to the concept and practice of composting using school lunch waste and gardening waste produced at the school.

#### **Specific Objectives:**

- To learn what is composting and the benefits this practice brings for the soil, and the environment in general.
- To learn the dos and don'ts for a compost recipe.
- To develop an information and educative campaign to teach the school population and staff how to classify the waste into organic and inorganic.
- To collect school waste and manage the aeration periods of the bins, as well as the temperature, and moisture level check.
- To record data to keep track of changes.
- To produce organic fertilizer for the School Garden.

Resources needed for lesson: Computer, projector, speakers

Resources needed for composting activity: Shovel, thermometer, gardening or rubber gloves, masks, metal tank for bin, or chicken mesh for pile, pitch fork or rake, plastic bags (it would be preferable to reuse super market bags brought in by the students), plastic bins to collect organic school waste, markers, paper, reusable cardboard boxes, and paint to create signs.

#### **Introduction Activity (15 min)**

The teacher will play the following short videos to introduce the concept of composting and how it's done, its benefits, the dos and don'ts:

[http://www.youtube.com/watch?v=ZAMy\\_ZJ0Xa8&NR=1&feature=fvwp](http://www.youtube.com/watch?v=ZAMy_ZJ0Xa8&NR=1&feature=fvwp)  
<http://www.youtube.com/watch?v=VoNCIpV505k&feature=related>

After the videos the teacher will ask the students what they understood and remember. Ask students to share about the dos and don'ts of what to place in the bin or pile from the school lunch waste and the importance that this compost will have in assisting the School Garden.

#### **Activity 1(15 min)**

The teacher will share with the group the information, and tips about composting, how to get started and how to manage a composting pile or bin using Michigan state's website:

<http://www.michigan.gov/kids/0,1607,7-247-49067-62499--,00.html>

#### **Activity 2 (20 min)**

Students will gather in groups of 3-4 students and will discuss the pros and cons of the following topics:

- Pile or bin?
- Where should the pile or bin be placed?
- Which part of the school waste (school lunch, gardening, cooking, etc.) would they use for composting?

*Students can access EPA's website containing the in and out list for a composting recipe:*

<http://www.epa.gov/osw/conserve/rrr/composting/basic.htm>

- When and how to turn the pile
  - When and how to measure moisture and temperature?
  - How would we be helping the environment with this practice?
- After the students have discussed these topics, the teacher will ask the groups to share their thoughts with the rest of the group to try to come to an agreement on which methods would be used and if they fit the school's needs.

### **Activity 3 (20 min)**

In the same groups the students will go to the Cornell Waste Management Institute's website and take the Composting Quiz to see how much they master the concepts and facts about composting.

<http://compost.css.cornell.edu/quiz1.html>

### **Activity 4 (45 min)**

Students will form groups of 3-4 students and will start to divide the work to be done, with the educative campaign. It is suggested that the groups are divided among the following tasks:

- Talk to gardening and cleaning staff at the school to show them the bins, and which is the waste that will be in them and their ultimate purpose
- Make posters to post around the school
- Make a script about what will be said to the students
- Make posters to paste on the bins to tell them apart from the other trash cans
- Locate bins where needed (<http://www.littlerotters.org.uk/pdfs/Wheretoputcompostbin.pdf>)

5 <sup>th</sup> Grade Composting Data Log				
Date	Temp (C)	Moisture	Student name	Observations and comments

\*Moisture will be monitored by observation and appreciation.

## Appendix 2

### 6<sup>th</sup> Grade School Garden

**Main Objective:** This lesson is intended to introduce, and guide the teacher and the students to plan, develop, and manage a school garden.

**Specific Objectives:**

- To learn about sustainable agriculture and how it benefits the environment.
- To introduce the concept Action Project to the student
- To learn about different types of gardens, and crops suitable in our climate.
- To plan and look for the most suitable places to plant different crops on school ground, trying to utilize available space (rooftops, already existing built in wall pots, and others)
- To develop a planting calendar based on the dry and rainy season of the DR, the sunlight exposure of the planting spaces.
- To learn about sustainable agriculture and manage the school garden in a way that the profits made from sales are only enough to make it sustainable for the next growing season.
- To learn about the benefits of having a school garden, for the school and the community, especially the surrounding poor community.

**Resources needed for lesson:**

- Handouts, teacher materials

**Resources needed for garden:**

- Wooden boards for raised beds, and/or metallic mesh for enclosed gardens, gardening tools, water hose, blue prints or maps of school ground, seeds, humus, support sticks for vined plants, movable plastic pots for rooftop garden, woodchips or other cellulose rich material (to lock in soil moisture on dry season), fertilizer to use prior to compost production, and assistance from the maintenance staff, parents, teachers and students.

**Introductory Activity (30 min):**

**What is an Action Project?**

The teacher will use the following material from the program Garden Mosaics from Cornell University to introduce the students to the terms Action Project. Each student will have a copy of the following material that will be discussed to introduce the Community Garden Project:

[http://communitygarden.org/gardenmosaics/pgs/action/Action\\_Summary.pdf](http://communitygarden.org/gardenmosaics/pgs/action/Action_Summary.pdf)

The teacher should introduce the connection with the Poverty theme so that the action project has a clearly defined purpose and objectives.

Later in groups of 3-4 students will discuss and fill out the following questions to start thinking about developing their action project:

[http://communitygarden.org/gardenmosaics/pgs/action/Action\\_Planning.pdf](http://communitygarden.org/gardenmosaics/pgs/action/Action_Planning.pdf)

### **Activity 1: Building up the Garden Team**

The teacher and the students will form the Garden Team, by seeking the help of administrative personnel, other teachers, parents, students and staff in general.

Setting up a meeting during one afternoon or lunch hour, could help to make time for the purpose of finding volunteers and getting people interested in the action project.

Once a consistent group of people have made a commitment to work together to make the garden sustainable and share the responsibilities of a school garden then the group can move on to design stage of the garden.

### **Activity 2: Designing**

Before meeting with the students, the teacher should have read the available material as a way to get a clear idea of which considerations need to be taken into consideration in the designing phase:

The Website from the California School Gardening Network has the following material available for designing, planting, maintaining the school garden:

<http://www.csgn.org/page.php?id=36>

The Kids Gardening Website has the following material (detailed lesson plan):

<http://www.kidsgardening.org/activity/design-your-own-garden>

After the teacher has reviewed these materials, she or he will be free to implement either one or mix and match strategies as she or he thinks fit the group of students.

The teacher should have available various copies of the blue print or map of the school grounds for the students to plan where the growing will take place. The teacher should remind students that they should plan to first make use of the available space (rooftop behind science lab, and built in pots on the surrounding school walls) and then plan which would be the best place for putting raise beds or a fenced garden.

### **Activity 3: Planning the Growing Season**

In order to make a good plan according to the wet and rainy seasons in the DR, the group will seek assistance from local farmers, and they should contact the DR Ministerio de Agricultura (809-547-3888) to have someone come and explain which crops would be best to plant which months and how to care for them.

### **Activity 4: Setting up the garden area**

Prior to planting, all the gardening areas must be put into place. Afternoon and weekends could be a good time to get the school community involved (parents, volunteer teachers, students and maintenance staff)

-Built in pots should be set up (weeded) and prepared with soil and humus and tagged with the crop to be planted.

-Roof top plastic pots should be prepared with soil and humus and tagged with the crop to be planted.



## Appendix 3

### 7<sup>th</sup> Grade

#### The Garbage Project

**Main Objective:** To help students understand how we pollute the planet by producing solid waste. To do this, the students will measure the weight, volume, and composition of the garbage produced in their household for seven days.

**Specific Objectives:**

- To understand what is considered waste and how waste is constantly produced by all of our daily activities.
- To understand how the world is polluted, natural resources depleted, and natural habitats altered in the process of making material goods.
- To introduce the concepts of reduce, reuse, and recycle, their meaning, their importance. Provide examples of how to put them into practice.
- To develop a table showing the composition of the family's solid waste.
- To graph the weight of garbage produced per household in a week, taking into account the number of family members. Does the amount of garbage produced correlate with the number of family members? Are there any apparent discrepancies in the data? What might account for the discrepancies?
- To start a database of each class. This information can be used to compare the weight, volume, and composition of the solid waste produced from year to year.

**Materials needed for lesson: Computer, projector, speakers**

**Materials needed for project: Plastic gloves, spring scale, handouts, pen or pencil**

**Introductory Activity (30 min):**

Students will watch The Story of Stuff from the Story of Stuff Project. This will introduce the questions "Where does waste come from?" It will also serve to introduce the importance of reducing, reusing and recycling.

<http://www.youtube.com/storyofstuffproject#p/u/22/9GorqroigqM>

**Activity 1 (15 min):**

After watching the Story of Stuff the teacher will guide an open discussion with the students addressing the following questions:

- What things do you consider waste? Name a few examples.
- Where do you think waste ends up? Is it really "out of sight, out of mind"? Why yes or no?
- In the end, who or what does the production of waste really affect? How?

**Activity 2 (10 min):**

Students will watch the following one minute Dutch ad without subtitles or translation:

<http://www.youtube.com/watch?v=mU9LpxctuQw>



Afterwards the teacher will ask the students to think about it silently and write on a piece of paper how it made them feel and why.

During the last five minutes of this activity, students who want to share their feelings and comments with rest of the class may do so, with guidance from the teacher.

### **Activity 3: The Garbage Project (20 min)**

The teacher will hand out the instructions for the project printed out so that every student has their own copy. (Attached to this lesson plan are examples of the printouts for students.)

The teacher will go over the instructions aloud and will answer any question that the students may have.

### **Activity 4: Reporting the results (30 min)**

After the students have completed their lab reports described in the student's handout they will briefly present their results to the class. After all the students have rendered their results the teacher will help the students determine the average pounds of garbage produced in a day by the class. The teacher should encourage the students to think about what this means for the country, and what do they expect this number will be in the future.

**Note:** The teacher must remember to ask the students how the project is going to ensure that the data collection is consistent.

### **Other Resources:**

**Be Waste Aware:** This flyer provides many more websites, information and activities for teachers and students.

<http://www.epa.gov/osw/education/pdfs/resource.pdf>

**Pack a Waste-Free Lunch:** Teach kids how to reduce, reuse and recycle when packing their school lunch.

<http://www.epa.gov/osw/education/pdfs/lunch.pdf>

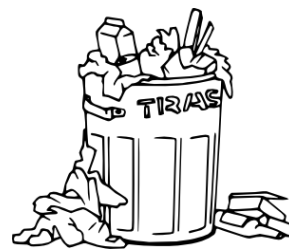
**Garbage Song:** This song is all about creating awareness about how much garbage we produce day to day.

<http://www.youtube.com/watch?v=lmD9IJh1Cr0>

## Appendix 4

### Garbage Activity Student Handout

# The Garbage Project



**Materials:** Spring scale (or digital if available), handout, pen or pencil, and rubber gloves.

#### **Instructions:**

1. Make sure that the garbage is not thrown out in your house until you have come back from school so you can weigh it. You are responsible for talking to the help, your parents, or whoever is charge of that task at home.
2. Always put on your rubber gloves before coming in contact with the garbage.
3. Weigh the bag of garbage by placing it on top of the spring scale, then write down the number of pounds on the chart below.
4. When using a spring scale sometimes it won't be accurate if the weight is less than a pound. Because of this, all bags that weigh less than a pound we'll round up to 1 pound.
5. Please look carefully at the contents of the garbage so that you can annotate your findings.
6. Count and record on the chart below how many recyclable objects there were in the contents of the garbage, and what they were made out of (glass, plastic, tin cans, paper, and cardboard).
7. Record in the chart what was in the degradable fraction of the garbage (Remember that leftover food, fruit and vegetable peelings and remains, and garden waste, are all degradable).
8. You will repeat these steps for seven days, to complete one full week.
9. At the end of the week, calculate the amount of garbage produced in the entire week, and also calculate the average weight of the garbage per day.
10. After you've gathered all the information you will complete a write up, following the instructions below.

#### **Write up Instructions:**

The write up for this project should follow the TCFL's Lab Report Format but containing:

- A. Cover sheet (School's name, student's name, class, subject, teacher's name, and due date)
- B. Introduction (1/2 page in which the student describes the purpose of the project and its importance)
- C. Materials and Methods (1/2 page in which the student mentions the materials used, and describes in general the procedure used to collect data)
- D. Charts and Data (The charts filled out containing the information collected each day)
- E. Discussion: 1page in which the student addresses:
  - His or her opinion on the amount of garbage produced in a week and the average per day in their household taking into account the number of people living at home.
  - How could some of the materials be reused at home?

- How could you reduce the amount of garbage produced at home?
- What do you think would be the result if everyone thought about this problem and actually decided to do something?

Garbage Project Data Collection Chart						
Name:					# of People in the Household:	
Day	Pounds	Cans	Glass	Plastic	Paper & Cardboard	Contents in degradable fraction of garbage
1						
2						
3						
4						
5						
6						
7						



## Appendix 5

### 8<sup>th</sup> Grade

#### Energy Audit Activity

**Main Objective:** This lesson is intended to make students understand how much energy and fuel is consumed monthly in the school. This activity can be connected with the electricity unit in preparation for Pruebas Nacionales.

#### Specific Objectives:

- To assess the overall school electricity consumption in Kw-hr during all the months of the school year by reviewing the school's electricity bill.
- To assess the overall consumption of fuel by the school's backup generator by reviewing the fuel bills and counting the number of times each month the generator is filled up with fuel.
- To learn about ways to reduce energy consumption at school and at home.
- To research and learn about renewable energy sources.
- To learn which alternative forms of energy would be convenient to use at the school. The student should be able to explain their reasoning.
- To apply what they've learned about energy saving at home to help reduce the electricity bill at home by reducing the energy consumption.
- To understand the concepts Watt, and Kw-hr.

**Materials for lesson and activity:** School's electricity and fuel bill, transparencies or scanned images of the bills, projector, overhead projector, computer.

#### Introductory activity: Analysis of home electricity bill (20 min)

The teacher will have asked the students in advance to bring a copy of one of their home electricity bills to class.

The teacher will ask the students to pair up and discuss what they see in their home bill, paying close attention to the different range in prices for the consumption of Kw-hr.

The teacher will explain the concept Kw-hr to the students.

Students will discuss which home appliances they consider consume the most energy and why? They should also think about ways to reduce the consumption.

**Activity 1 (45 min):** Using a modification of EarthCARE™'s What Types of Light activity, the students will read over the background information about light bulbs, how they work, and which are more energy efficient.

[http://www.earthcarecanada.com/earthcare\\_program/Lessons/8\\_types\\_lights.pdf](http://www.earthcarecanada.com/earthcare_program/Lessons/8_types_lights.pdf)

The teacher will divide the students into groups of 3-4 students to audit all the light bulbs at the school, sending each group to a different area. Students will write down what types of lights there are and how many are in each area. (The teacher will have spoken in advance with the staff or custodian to assist in this process in case students need help.)

The students will count how many computers, ceiling fans, and other electrical appliances there are in each area.

Students will fill out the information in the chart below. After this, the students will estimate, as closely as possible, for how long these lights and appliances are turned on. They will investigate how much energy they consume in Kw-hr per day, week and month. After the students have made their calculations they will compare their results to the most recent school electricity bill.

Area/Classroom:	# Lights	Type	# Ceiling fans	Appliance
Commentaries/Notes:				

### Activity 2 (20 min): Electricity and Fuel bill Analysis

The teacher will have a scanned copy of both school's energy and fuel bill, or a transparency to use an overhead projector to analyze the consumption of both electricity and fuel on a monthly basis. The students will create a data base using Excel in which they will record the total Kw-hr consumed monthly. They will also calculate the total gallons of fuel consumed by the backup generator each month.

The teacher will point out the different categories in the price according to Kw-hr consumed specified in the bill. Also, the teacher will point out any trend in the pattern of consumption.

### Activity 3 (20 min): Research and Suggestions

The students will explore alternative forms of energy that could be applied at the school. The students must be very specific about which type of energy, and in how much it would decrease the consumption of electricity or fuel. Using the estimated decrease in consumption, the students will determine if it is worth the investment and how quickly the invested money will be recuperated.

### Activity 4 (1 Week): Lab Write up Report

Students will submit a formal lab write up report following the school's format (Report Title, Abstract, Introduction, Materials & Procedure, Analysis & Observation, Conclusion, Works Cited) in which they will explain in detail their reasoning and actions in the activities No.2 and 3.

**Note:** For activity 3 it could be best to have at least three bills to start looking for patterns.

## Appendix 6

### 5<sup>th</sup> Grade Letter to Parents at Open School (Saturday 10<sup>th</sup> of September 2011)

#### Dear 5<sup>th</sup> Grade Parents:

Welcome to a brand new school year filled with special learning opportunities for your children. This year, The Community for Learning is taking another step towards implementing new teaching strategies and activities. The school has decided to take part in a pilot project with the Environmental Science program at the Rochester Institute of Technology in the US. The purpose of this pilot project is to expose the students (5<sup>th</sup> -8<sup>th</sup> Grade) to sustainability and environmental concepts through hands on activities.

This year the fifth grade students will be taking a good look at composting, as part of the Rocks and Minerals unit theme. The main objective of this activity is to show the children how the soil is enriched through composting organic matter. Also, this activity will help address a very urgent matter in our country, which is solid waste reduction. By learning to compost, students will have the opportunity to transform the degradable part of the garbage into rich organic fertilizer that will be used in the new school garden in 6<sup>th</sup> grade.

Composting is safe and the children will be working closely with their teachers to ensure a healthy, and a clean learning environment. The students will not be directly in contact with any noxious waste; it will only be gardening waste (e.g. dead leaves, pruned tree branches and dried grass), and some of their own lunch left overs (e.g. fruit peelings, bread crumbs, and paper napkins); of course always handled with the proper safety equipment. The decomposing process will take place in metal bins which guarantees safe manipulation without touching the compost. This activity can easily be replicated at home to reduce the household waste and use the compost to fertilize any home plants or even start a window or balcony herb garden.

We hope that you support our initiative of becoming more environmentally aware, and an overall greener school. With your support and collaboration together with the teachers' guidance and your children's participation we can start to make a difference.

**Laura Tejeda**  
MS Candidate  
Environmental Science Program  
Rochester Institute of Technology

## Appendix 7

### 6<sup>th</sup> Grade Letter to Parents at Open School (Saturday 10<sup>th</sup> of September 2011)

#### Dear 6<sup>th</sup> Grade Parents:

Welcome to a brand new school year filled with special learning opportunities for your children. This year, The Community for Learning is taking another step towards implementing new teaching strategies and activities. The school has decided to take part in a pilot project with the Environmental Science program at the Rochester Institute of Technology in the US. The purpose of this pilot project is to expose the students (5<sup>th</sup> -8<sup>th</sup> Grade) to sustainability and environmental concepts through hands on activities.

This year the 6<sup>th</sup> grade students will be in charge of developing and caring for a school garden. Through this activity the children will learn about sustainable agriculture and the benefits that this can offer to our country. At the same time students will make this school garden a community action project. The produce will be offered to a specific poor community at reduced prices, only making enough to ensure that the garden can be in the next year's growing season. This project will be linked to the poverty theme, as way to show children that sustainable agriculture can also serve to improve living conditions in poor communities.

This activity will require that everyone is involved. We would love to have parents as volunteers to work along teachers, students, and school staff to help us get the project going. We want to make this garden continuous; passed on from group to group over the years. This continuity in time will ensure better produce each year, and therefore better opportunities to help the community in need.

This activity can easily be put into practice at home to continue to learn about different forms of agriculture by starting a window, balcony, or back yard garden to share with your children.

We hope that you support our initiative of becoming more environmentally aware, and an overall greener school. With your support and collaboration, together with the teachers' guidance and your children's participation we can start to make a difference.

**Laura Tejada**  
MS Candidate  
Environmental Science Program  
Rochester Institute of Technology

## Appendix 8

### 7<sup>th</sup> Grade Letter to Parents at Open School (Saturday 10<sup>th</sup> of September 2011)

#### Dear 7<sup>th</sup> Grade Parents:

Welcome to a brand new school year filled with special learning opportunities for your children. This year, The Community for Learning is taking another step towards implementing new teaching strategies and activities. The school has decided to take part in a pilot project with the Environmental Science program at the Rochester Institute of Technology in the US. The purpose of this pilot project is to expose the students (5<sup>th</sup> -8<sup>th</sup> Grade) to sustainability and environmental concepts through hands on activities.

This year the 7<sup>th</sup> grade students will learn about human population dynamics in Science. As part of this unit they will learn about overpopulation and its detrimental impact on the planet's resources. As part of this unit students will have to complete a hands-on investigation called "The Garbage Project". Because one of the most important effects of overpopulation is the increase of solid waste (garbage) production, with this project students will learn how to reduce its production starting in their own homes. At the same time, students will also learn about reusing and recycling materials that would've been discarded as waste (e.g. metal, plastic, and glass containers, paper and cardboard).

The students will have to weigh their household's solid waste every day for seven days using a spring scale. Now, do not panic, this project is safe and the students will be working closely with their teachers to ensure a healthy, and a clean learning environment. Students will take home a printed step by step instruction sheet provided by the teacher to prevent them of coming in direct contact with any type of solid waste. Students will always wear safety gear (e.g. rubber gloves, and something to cover their mouth if necessary). At the end students, will have to write down their findings to create a data base that will serve to compare the following year's data. The objectives of this project are for the students become aware of how much solid waste a single household produces, to think about how that number grows when adding more households, and to think about why is it important to reduce these figures. We hope that you will continue to participate by reducing the waste you produce at home.

This activity will help address a very urgent matter in our country which is solid waste reduction. We hope that you support our initiative of becoming more environmentally aware, and an overall greener school. With your support and collaboration together with the teachers' guidance and your children's participation we can start to make a difference.

**Laura Tejeda**  
MS Candidate  
Environmental Science Program  
Rochester Institute of Technology



## Appendix 9

### 8<sup>th</sup> Grade Letter to Parents at Open School (Saturday 10<sup>th</sup> of September 2011)

#### Dear 8<sup>th</sup> Grade Parents:

Welcome to a brand new school year filled with special learning opportunities for your children. This year, The Community for Learning is taking another step towards implementing new teaching strategies and activities. The school has decided to take part in a pilot project with the Environmental Science program at the Rochester Institute of Technology in the US. The purpose of this pilot project is to expose the students (5<sup>th</sup> -8<sup>th</sup> Grade) to sustainability and environmental concepts through hands on activities.

This year the 8<sup>th</sup> grade students will be learning about electricity and energy consumption. Guided by their Science teacher they will perform an energy audit to evaluate the school's energy and fuel consumption. They will track changes in the consumption by assessing the electricity and the back- up generator's fuel bill each month. Also, students will be in charge of researching which forms of alternative energy would be suitable for the school. They will have to explain whether or not the decrease in energy consumption would be worth the investment in any new technology.

This activity will require that everyone is involved, and we would love to have parents working along teachers, students, and school staff to help us with the project. We're looking not only for the students to gain knowledge about saving energy, but we also want to accomplish a change in attitude. We wish for our students to become more environmentally aware of how much energy they consume or waste, and the negative effects that over-consuming and wasting any kind of energy form can have on the planet.

We hope that you support our initiative of becoming more environmentally aware, and an overall greener school. With your support and collaboration together with the teachers' guidance and your children's participation we can start to make a difference.

**Laura Tejeda**  
MS Candidate  
Environmental Science Program  
Rochester Institute of Technology



## Appendix 11

### 6<sup>th</sup> Grade School Garden Pre-Test

*Remember that there are no right or wrong answers in this pre-test, so relax and answer away!*

1. Have you heard about what an action project is? \_\_\_\_ YES      \_\_\_\_ NO
2. If your answer is yes, please tell us where you learned about action projects?
3. What did you learn or how much do you remember about action project?
4. Are you familiar with what a school garden is? \_\_\_\_ YES      \_\_\_\_ NO
5. If your answer is yes, please tell us where you learned about school gardens?
6. What did you learn or how much do you remember about school gardens?
7. Do you think that growing vegetables in an unused space can help fight poverty? \_\_\_\_ YES \_\_\_\_ NO
8. Why yes or no?
9. Do you think growing vegetables in an unused space can help care for the environment?  
\_\_\_\_ YES      \_\_\_\_ NO
10. Why yes or no?

## Appendix 12

### 7<sup>th</sup> Grade School Garbage Project Pre-Test

*Remember that there are no right or wrong answers in this pre-test, so relax and answer away!*

1. Have you ever heard about overpopulation? \_\_\_\_ YES \_\_\_\_ NO
2. If your answer is yes, please tell us where you learned about overpopulation?
3. What did you learn or how much do you remember about overpopulation?
4. Do you think that population growth and increase in waste are related? \_\_\_\_ YES \_\_\_\_ NO
5. Why yes or no?
6. Do you think humans should reduce the amount of waste they produce? \_\_\_\_ YES \_\_\_\_ NO
7. Why yes or no?
8. Do you think waste is harmful to the environment? \_\_\_\_ YES \_\_\_\_ NO
9. Why yes or no? Please some provide examples.
10. Are you already doing something to reduce the amount of waste you and your family produce?

## Appendix 13

### 8<sup>th</sup> Grade Energy Audit Pre-Test

*Remember that there are no right or wrong answers in this pre-test, so relax and answer away!*

1. Are you familiar with what an energy audit is? \_\_\_\_\_ YES      \_\_\_\_\_ NO
2. If your answer is yes, please tell us where you learned about it?
3. What do you know or remember about energy audits?
4. Do you consider saving energy at home and school something important? \_\_\_YES \_\_\_NO
5. If your answer is yes, please mention some examples on how we can save energy at home or at school.
6. Do you already practice saving energy at home? \_\_\_\_\_ YES      \_\_\_\_\_ NO
7. Why yes or no?

## Appendix 14

### Project Assessment Tasks

Task	Responsible	Comments/Observations
Prepare Pretests	Laura Tejada	
Administer Pretests	Designated Teachers	
Hand out and collect Informed Consent documentation	Gabriela Flaquer	
Set up focus groups times according to teachers' available time.	Gaby Flaquer	Will have to work in conjunction with Gabriela Flaquer to set up a time for all of the groups in each class.
Administer and moderate focus group sessions.	Laura Tejada	
Set up interviews times according to staff and teachers' available time.	Laura Tejada	
Administer and moderate staff and teachers interviews.	Laura Tejada	
Transcribe focus groups and interviews to text documents	Laura Tejada	
Analyze qualitative/quantitative data	Laura Tejada	

## Appendix 15

## Activities Timelines

5 <sup>th</sup> Grade Composting Activity Timeline											
Activities /Tasks	Sept/ 2011	Oct/ 2011	Nov/ 2011	Dec/ 2011	Jan/ 2012	Feb/ 2012	Mar/ 2012	Apr/ 2012	May/ 2012	Jun/ 2012	Description/ Comments
Pre-test	Δ▼										Test students' prior knowledge.
Introduction Activity	Δ▼										Introduce concept, how it's done, benefits, do's and don'ts.
Activity 1	Δ▼										Tips, how to get started.
Activity 2	Δ▼										Project logistics.
Activity 3		Δ▼									Composting quiz.
Activity 4		Δ▼									Task groups.
Make compost		Δ								▼	Set up and begin.
Data log		Δ								▼	Keep weekly record of temperature, moisture and comments.
Focus Groups					Δ	▼					Collect data through group interviews.
Posttest						Δ▼					Test students' knowledge gained and possible change in attitude.

Legend: ▼ = Ending date, Δ = Beginning date

6 <sup>th</sup> Grade School Garden Activity Timeline											
Activities /Tasks	Sept/ 2011	Oct/ 2011	Nov/ 2011	Dec/ 2011	Jan/ 2012	Feb/ 2012	Mar/ 2012	Apr/ 2012	May/ 2012	Jun/ 2012	Description/ Comments
Pre-test			Δ▼								Test students' prior knowledge.
Introduction Activities			Δ▼								Introduce action project, define planting places and garden types.
Define group of volunteers			Δ▼								Define group of volunteers(staff, teachers, parents, students)
Watering/ weeding schedule			Δ							▼	Keep monthly record of energy bill and gallons of fuel consumed.
Focus Groups						Δ	▼				Collect data through group interviews.
Posttest							Δ▼				Test students' knowledge gained and possible change in attitude.

Legend: ▼ = Ending date, Δ = Beginning date



7 <sup>th</sup> Grade Garbage Project Activity Timeline											
Activities /Tasks	Sept/ 2011	Oct/ 2011	Nov/ 2011	Dec/ 2011	Jan/ 2012	Feb/ 2012	Mar/ 2012	Apr/ 2012	May/ 2012	Jun/ 2012	Description/ Comments
Pre-test						Δ▼					Test students' prior knowledge.
Introduction Activities						Δ▼					Introduce garbage project, go over details of data collection.
Data collection						Δ▼					7 days of data collection
Write up						Δ▼					Keep monthly record of energy bill and gallons of fuel consumed.
Focus Groups							Δ▼				Collect data through group interviews.
Posttest							Δ▼				Test students' knowledge gained and possible change in attitude.

Legend: ▼ = Ending date, Δ = Beginning date

8 <sup>th</sup> Grade Energy Audit Activity Timeline											
Activities /Tasks	Sept/ 2011	Oct/ 2011	Nov/ 2011	Dec/ 2011	Jan/ 2012	Feb/ 2012	Mar/ 2012	Apr/ 2012	May/ 2012	Jun/ 2012	Description/ Comments
Pre-test		Δ▼									Test students' prior knowledge.
Introduction Activity		Δ▼									Introduce basic concepts work, energy, Kw-hr
Energy and Appliance check -ups		Δ▼									Check light bulbs and appliances to estimate energy consumption based on hours of usage.
Data log		Δ							▼		Keep monthly record of energy bill and gallons of fuel consumed.
Focus Groups					Δ	▼					Collect data through group interviews.
Posttest						Δ▼					Test students' knowledge gained and possible change in attitude.

Legend: ▼ = Ending date, Δ = Beginning date

## Appendix 16

### 5<sup>th</sup> Grade Composting Post-Test

*Remember that there are no right or wrong answers in this post-test, so relax and answer away!*

1. What is composting?
2. How do you feel about producing fertilizer from your own lunch waste (left over food) and garden waste (cut grass and dry tree branches)?
3. What are the benefits of composting?
4. Are there any reasons not to try composting?
5. Would you be willing to try composting at home? Explain why or why not.



## Appendix 18

### 7<sup>th</sup> Grade School Garbage Project Post-Test

*Remember that there are no right or wrong answers in this post-test, so relax and answer away!*

1. What is overpopulation?
2. What are some of the effects of overpopulation on the environment?
3. Do you think humans need to reduce the amount of waste they produce? Why?
4. Can you name some of the things we can do to reduce the amount of waste produced at home and at school?

**Appendix 19****8<sup>th</sup> Grade Energy Audit Post-Test**

*Remember that there are no right or wrong answers in this post-test, so relax and answer away!*

1. What is an energy audit?
2. What are some of the benefits for the environment of saving energy at home and at school?
3. Can you list some examples about how to save energy at home or at school?
4. Do you already practice saving energy at home?  YES  NO
5. Why yes or no?

## Appendix 20

### 5<sup>th</sup> Grade: Composting Activity Assessment Focus Groups Questionnaire Instrument

- This instrument was developed following Krueger’s (1998) methodology in his Focus Group Book Kit No. 3: Developing Questions for Focus Groups.
- Modifications were made to fit the needs of group sessions with preteen and teen members. The time has reduced from 2 hours to an approximate of 45 minutes.
- The participants are going to be chosen by the teachers according to their schedule on the day of the focus group. All students in the class will have an opportunity to participate in a focus group.
- The key question time was reduced from a suggested of 10-15 min discussion per question to 5-7 min discussion considering the participants are between 11 and 14 years of age.
- The moderator will seek to ensure a continuous flow of information from the participants when needed, and to maintain the conversational structure of the focus groups.

Question (Type)	Estimated Time for Answer
1. Tell us your first name and which is your favorite subject or class. (Opening)	(30s)
2. When you hear the word “composting” what comes to your mind? (Introductory)	(1-2 min)
3. How do you feel about composting? (Transition)	(1-2 min)
4. Do you think composting is important for the environment? Has this composting activity changed your thinking about compost? (Key)	(5- 7 min)
5. Have you recommended composting to a friend or family member? Why or why not? If you have recommended composting to someone, what did you say to try to convince them to compost? (Key)	(5-7 min)
6. Do you consider composting something difficult to do at home? Explain your answer. (Key) Probe: What factors could prevent you from composting?	(5-7 min)
7. If you could change one thing about the way we did this composting activity, what would that be? Why? (Ending)	(1- 2 min)

## Appendix 21

### 6<sup>th</sup> Grade School Garden Assessment: Focus Groups Questionnaire Instrument

- This instrument was developed following Krueger's (1998) methodology in his Focus Group Book Kit No. 3: Developing Questions for Focus Groups.
- Modifications were made to fit the needs of group sessions with preteen and teen members. The time has reduced from 2 hours to an approximate of 45 minutes.
- The participants are going to be chosen by the teachers according to their schedule on the day of the focus group. All students in the class will have an opportunity to participate in a focus group.
- The key question time was reduced from a suggested of 10-15 min discussion per question to 5-7 min discussion considering the participants are between 11 and 14 years of age.
- The moderator will seek to ensure a continuous flow of information from the participants when needed, and to maintain the conversational structure of the focus groups.

Question (Type)	Estimated Time for Answer
8. Tell us your first name and which is your favorite subject or class. (Opening)	(30s)
9. Can you describe how having a garden at the Community for Learning or having a garden at home can be used to help a poor community?(Introductory)	(1-2 min)
10. How have you been part of the school garden project? What have you done to help? (Transition)	(1-2 min)
11. Do you think having a school or home garden can be good for the environment? (Key) If so, please explain your answer.	(5- 7 min)
12. Do you think having a school or home garden can help people in need? (Key) If so, please explain your answer.	(5-7 min)
13. Have you talked to your parents or anyone else about having a home garden? Why yes or no? (Key) Probe: Has anything prevented you from doing this? If so, what?	(5-7 min)
14. Have you tried growing anything at home? Why yes or no? (key) Probe: Has anything prevented you from doing this? If so, what?	(5-7 min)
15. If you could change one thing about the way we did this school garden, what would that be? Why? (Ending)	(1- 2 min)



## Appendix 22

### 7<sup>th</sup> Grade Garbage Project Assessment: Focus Groups Questionnaire Instrument

- This instrument was developed following Krueger's (1998) methodology in his Focus Group Book Kit No. 3: Developing Questions for Focus Groups.
- Modifications were made to fit the needs of group sessions with preteen and teen members. The time has reduced from 2 hours to an approximate of 45 minutes.
- The participants are going to be chosen by the teachers according to their schedule on the day of the focus group. All students in the class will have an opportunity to participate in a focus group.
- The key question time was reduced from a suggested of 10-15 min discussion per question to 5-7 min discussion considering the participants are between 11 and 14 years of age.
- The moderator will seek to ensure a continuous flow of information from the participants when needed, and to maintain the conversational structure of the focus groups.

Question (Type)	Estimated Time for Answer
16. Tell us your first name and which subject or class you enjoy the most at school. (Opening)	(30s)
17. Please explain what you understand by solid waste or garbage.(Introductory)	(1-2 min)
18. How do you think solid waste affects the environment? (Transition)	(1-2 min)
19. How do you think reduce, reuse and recycle can decrease the amount of waste we produce? (Key)	(5- 7 min)
5. Did the "Garbage Project" change your mind about the way you and your family dispose of waste? (Key) If so, how?	(5-7 min)
6. Has this project caused you to make changes in what you or your family does with your waste? Why or why not? (Key) If the project caused you to change what you do with your waste, please describe the change.	(5-7 min)
7. If you could change one thing about the way we did this "Garbage Project", what would that be? Why? (Ending)	(1- 2 min)

## Appendix 23

### 8<sup>th</sup> Grade Energy Audit Project Assessment: Focus Groups Questionnaire Instrument

- This instrument was developed following Krueger’s (1998) methodology in his Focus Group Book Kit No. 3: Developing Questions for Focus Groups.
- Modifications were made to fit the needs of group sessions with preteen and teen members. The time has reduced from 2 hours to an approximate of 45 minutes.
- The participants are going to be chosen by the teachers according to their schedule on the day of the focus group. All students in the class will have an opportunity to participate in a focus group.
- The key question time was reduced from a suggested of 10-15 min discussion per question to 5-7 min discussion considering the participants are between 11 and 14 years of age.
- The moderator will seek to ensure a continuous flow of information from the participants when needed, and to maintain the conversational structure of the focus groups.

Question (Type)	Estimated Time for Answer
20. Tell us your first name and which subject or class you enjoy the most at school. (Opening)	(30s)
21. Please explain your understanding of energy consumption.(Introductory)	(1-2 min)
22. How do you think energy production and consumption affect the environment? (Transition)	(1-2 min)
23. Do you think reducing the energy bill or the fuel consumption at school or at home, can have an impact on the environment? (Key) Please explain your answer.	(5- 7 min)
24. Did the “Energy Audit Project” change your mind about the way you and your family consume electricity and fuel? (Key) If so, how?	(5-7 min)
25. Has this project caused you to make changes in how you or your family consumes energy? Why or why not? (Key)  If the project caused you to change how you consume energy, please describe the change.	(5-7 min)
26. If you could change one thing about the way we did this “Energy Audit Project”, what would that be? Why? (Ending)	(1- 2 min)

## Appendix 24

### Teacher Assessment Interviews

\*The teacher will be asked questions regarding the activity he or she was in charge of implementing during the school year.

\*The researcher will ask questions concerning the teacher's input, ideas, perceptions, and opinions regarding the development, and implementation of the activity.

\* These are semi-structured interviews. The interviewees will be asked probing questions to make sure the researcher gets the best understanding possible about their opinions and views concerning the activities.

### 5<sup>th</sup> Grade: Composting

1. How well do you think this activity connected with the “Rocks and Minerals” theme?
2. What do you think were the biggest challenges for this activity? Why?
3. How did you approach or manage these challenges?
4. Explain how important you consider this activity to be in terms of helping the students achieve a better understanding of composting and to develop more sustainable conduct.
5. Do you think students will replicate this activity at home? Why or why not?
6. Did this activity motivate you to try to compost at your home or other location outside of the school? Why or why not?
7. Do you consider composting a helpful practice for the environment? Why or why not?
8. What is your perception of the interest and support that parents provided to the activity?
9. Is there anything that you think could be included, or excluded in the lesson plan in order to make it more interesting for students?
10. Do you have any other suggestions for improving this activity?
11. Overall do you think this activity should be continued in future school years? Why or why not?

### 6<sup>th</sup> Grade: School Garden

1. How well do you think this activity connected with the “Poverty” theme?
2. What do you think were the biggest challenges for this activity? Why?
3. How did you approach or manage these challenges?
4. Explain how important you consider this activity to be with respect to helping the students achieve a better understanding of the environmental and community impacts of gardens.
5. Do you think students will replicate this activity at home? Why or why not?
6. Did this activity motivate you to try to start a home garden? Why or why not?
7. Do you consider having a school or home garden a helpful practice for the environment? Why or why not?
8. Do you consider having a school or home garden a useful way to help fight poverty? Why or why not?
9. What is your perception of the interest and support that parents provided to the activity?

10. Is there anything that you think could be included, or excluded in the lesson plan in order to make it more interesting for students?
11. Do you have any other suggestions for improving this activity?
12. Overall do you think this activity should be continued in future school years? Why or why not?

### **7<sup>th</sup> Grade: Garbage Project**

1. How well do you think this activity connected with the “Population Dynamics” theme?
2. What do you think were the biggest challenges for this activity? Why?
3. How did you approach or manage these challenges?
4. Explain how important you consider this activity to be with respect to helping the students understand the impacts of solid waste and with respect to helping them to undertake more sustainable solid-waste practices.
5. Do you think students will replicate this activity at home? Why or why not?
6. Did this activity motivate you to try to assess or reduce waste production in your own household? Why or why not?
7. Do you consider reducing the amount of solid waste we produce a helpful practice for the environment? Why or why not?
8. What is your perception of the interest and support that parents provided to the activity?
9. Is there anything that you think could be included, or excluded in the lesson plan in order to make it more interesting for students?
10. Do you have any other suggestions for improving this activity?
11. Overall do you think this activity should be continued in future school years? Why or why not?

### **8<sup>th</sup> Grade: Energy Audit**

1. How well do you think this activity connected with the “Work and Energy” theme?
2. What do you think were the biggest challenges for this activity? Why?
3. How did you approach or manage these challenges?
4. Explain how important do you consider this activity to be, with respect to helping the students achieve more sustainable energy use.
5. Do you think students will replicate this activity at home? Why or why not?
6. Did this activity motivate you to try to assess or reduce energy consumption in your own household? Why or why not?
7. Do you consider reducing the amount of energy and fuel we consume a helpful practice for the environment? Why or why not?
8. What is your perception of the interest and support that parents provided to the activity?
9. Is there anything that you think could be included, or excluded in the lesson plan in order to make it more interesting for students?
10. Do you have any other suggestions for improving this activity?
11. Overall do you think this activity should be continued in future school years? Why or why not?

## Appendix 25

### Staff Interview Assessment Document

\*The staff members to be interviewed are the two school principals Carla Meyrink and Tami Haverly, and the coordinator of the Science department Gabriela Flaquer.

\*The staff members will be asked questions regarding their perceptions about all the activities implemented during the school year.

\*The researcher will ask questions concerning the teachers' input, ideas, and opinions regarding the activities.

\* These are semi-structured interviews. The interviewees will be asked probing questions to make sure the researcher gets the best understanding possible about their opinions and views concerning the activities.

1. What is your overall perception of the activities that were implemented in 5<sup>th</sup> -8<sup>th</sup> grade?
2. In which activity were you most involved? Is there any specific reason why?
3. What do you think were the biggest challenges for the activities in 5<sup>th</sup>-8<sup>th</sup> grade? Why?
4. How did you, from your management position, help the teachers approach or manage these challenges?
5. Explain how important you consider these activities to be in terms of helping the students to become more environmentally aware and to act in a more sustainable manner.
6. Do you think students will replicate any of these activities at home? Why or why not?
7. Do you consider one activity easier for the students to replicate than another? If yes, please state which activity and why you feel that this activity is easier to replicate?
8. Did any of these activities motivate you to try to replicate or implement them in your own house or anywhere outside of the school environment? Why or why not?
9. Do you consider any of these activities to represent a good practice with respect to the environment and/or sustainability? Why?
10. What is your perception of the level of interest and support that parents provided to the activities?
11. Could you provide us with any suggestions to improve any of the activities?
12. Overall do you think these activities should be continued in future school years? Why or why not?

## Appendix 26

### 5<sup>th</sup> Grade Group 1 Transcript

Hello guys! Ok, for the first question I want each and every one of you to tell me your name and your favorite subject at school.

Girl 1: My favorite subject is Theme

Thank you, who's next?

Girl 2: My favorite subject is Reading

Ok, now for the guys

Boy 1: My favorite subject is Sports, I mean PE

Good!

Boy 2: My favorite subject is PE

Ok, thank you! Last one...

Boy 3: My favorite subject is Reading

Ok, very good! Now I'm going to tell you a word and I want you to tell me the first thing that comes to your mind. Whatever, whatever comes to your mind. What comes to your mind when I say composting? And I know you've heard a lot about it, I just want to know what goes to your head?

Girl 2: Earth.

The Earth, ok what about the Earth?

Girl 2: That we are going to make it better by doing this project

Ok, thank you very much, who else?

Boy 2: I think of plants.

Ok, why plants?

Boy 2: Because, eh... I think of plants because when we do compost I always related it to plants...

Ok, anybody else?

Boy 3: When I think of compost I think of soil.

Soil ok, what about soil?

Boy 3: that we are composting garbage to make it into soil for planting

Ok, thank you, awesome

Boy 1: When I hear the word composting I think about banana peels.

Ok, why do you think about banana peels?

Boy 1: Because they decompose fast and I don't know that many things decompose like that.

Ok, thank you, very good

Girl 1: I can picture the image behind the science lab where we're doing everything

Ok, thank you very much. Now the next question is how do you feel about composting, and listen to the words, how do you feel? Not what you've been told, not what you've learned, just how do you feel? Do you like it, not like it, does it make you feel yucky, does it make you feel nice? Tell me how you feel.

Girl 2: It makes me feel good and nice because when compost we are making a better world and we are making less damage.

Ok, yes

Boy 2: It makes me feel nice because I know that I am helping the world

Ok, thank you

Boy 1: It makes me feel good because the world will be safe.

Ok, how is the world going to be safe? Explain

Boy 1: by not throwing garbage

Ok thank you

Boy 3: I feel happy because if we keep composting we'll be able to grow plants in the end

Ok, thank you very good

Girl 1: I feel good because I am meeting with other people to help the planet.

Ok, thank you very much

Now we're moving to question number 4, I want you to answer if you think composting is important for the environment?

Boy 3: Yes, because if we do this then there will be more clean places and plants will grow better and healthier

Girl 2: Yes, because if when something decomposes it turns into soil, then we can have plants and plants bring good things for the world.

Boy 1: Yes because we could save the world

Boy 2: Yes because when we like, compost, plant or do something we inspire other people to the same, and together we'll make a better world

Girl 1: I think is good because it helps the plants to grow stronger and healthier and that is better because the plants help us to breathe.

Ok, very good, thank you

Now guys I need you to think before you started the composting activity. If I would have told you that you were going to collect lunch waste, and banana peels and natural waste that would decompose, would you have been comfortable or would that would've make you feel 'yaky'?

Students look at each other as if they don't understand the question

In the beginning when you didn't know about composting, if I would've told you that you were going to make something out of garbage, how would that have made you feel?

Boy 2: You know, it would've made me feel "yuky" because I've never been working with garbage and I thought it was too dirty.

Boy 3: It would have made feel yuky, because I hate garbage and it's too yuky ... (I hate garbage, almost inaudible)

Boy 1: I would've been ok because I don't mind garbage and I have worked with it before

Girl 1: It would depend, because if you told me it was to make the world a better planet I would like to do it, but if is for I don't know... other stuff I would feel yuky.

Girl 2: I would feel both because if we use garbage to do something we're recycling and we are not using so many things that damage the world, but is still disgusting because we have to take the garbage out of the trash can, and its yuky..

Ok, I understand perfectly. Now that you know about composting and that its good for the environment like you said, how do you feel now? Did composting make you change your mind about garbage?

Everyone says yes at the same time. Can you raise your hands so that I can see who says yes? Ok 5 of you everybody raised a hand that's good! Ok let's move on to the next question. Have any of you recommended composting to a friend or family member?

Everybody raises their hand as if they want to participate. Are you raising your hands because all of you have talked to somebody about composting?

Students all answer yes at the same time.

Aright what have you said?

Boy 2: I told my mom that we need to do composting because it helps the world and I told her to tell it to her friends.

Ok, did your mom try to compost?

Boy 2: No

Not yet? Why do you think your mom hasn't started to compost?

Boy 2: Because she is occupied all day

Ok, alrighty

Boy 1: I told my family that we need to recycle, and compost ... En el Nacional they have a huge thing to recycle newspaper, and other stuff

Yes they have a collection center for newspapers, and tetra packs. Ok, and what did your mom say?

Boy 1: That we are going to do it, and when she goes to the supermarket she puts all the newspaper there.

Ok, what about composting at home, what did she say about that?

Boy 1: she said that is a good idea, and she started a little

What has she done?

Boy 1: We have like 3 garbage cans, were we put the compost one, the regular one and the recycling one.

So you're composting a little bit, what do you plan to do with the compost?

Boy 1: That I don't know...

Ok, thank you very much. Who wants to go next?

Girl 1: Yes I have told my mom about composting project and I told her that it would be a good idea to do it at the Saint George School because she works there.

Ok, so you gave your mom the idea to do it at Saint George School, what did she say?

Girl 2: She said that she was going to ask her boss.

Ok do you know if she talked to her boss about it?

Girl 2: No, I forgot...

That's ok, now have you guys tried composting at home?

Girl2: yes, yesterday I was eating a banana and I took a smaller trashcan, empty and I put it there, so I am going to start composting there

Ok, what do you think mom is going to say about that?

Girls makes face like she is in trouble...

Girl 2: I don't know

It would be good to ask her, thank you!

Boy 3: I tried to talk to her (mom), but the thing is I have a big dog and the dog is always messing with things.

Ok, let me see if I understand, you live in a house and there is a backyard but there is a dog in there?

Boy 3: Yes there is a dog to protect us, but everything that we put in there he will eat, even wires, everything.

OK, thank you

Girl 1: I told my mom and she said it was very good, because she works here.

Ok, so what does your mom think about composting at home?

Girl 1: We live in an apartment.

Ok, so you think that composting in an apartment is difficult?

Girl 1: Yes



Gaby: I have compost in my apartment!

I was going to tell you that, its ok to compost in small containers, and you can let it breathe for a little bit during the day. You can just choose certain things the one that won't make it stink a lot, if you do it properly it doesn't really stink much, and you won't attract flies if you keep it covered most of the day. You can compost in an apartment, it can seem difficult but it really isn't!

Ok, now I have one last question, if you wanted to change something about the composting activity what would it be and why? What would you improve or make better?

Boy 3: I would like have more people doing it, like some people could do it at home and then bring it to school when its ready so we could have multiple composting places and do it faster.

Ok that is an awesome idea Pedro thank you!

Boy 1: I would put more composting bins so we could make more at the same time

Ok, thank you

Girl 1: I would change the way we collect the trash just have one big one instead of many small ones because it is very difficult to collect the trash.

Ok so instead of four places to put trashcans you would change it to one only?

Girl 1: yes

Girl 2: I would add more people from the school to the composting project I would do 4<sup>th</sup> grade 5<sup>th</sup> grade and 6<sup>th</sup> grade

Ok, so you think you need reinforcements?

Girl 2: yes

Ok in what way do you need reinforcements? Do you need people to help you collect the waste or do you need people to help teach other kids how to properly put the waste in the bins?

Girl 2: Yes! The kids, they keep putting the trash in the wrong trash cans. Me and my friend went to all the classroom explaining that was bad because they don't put the trash where it needs to go!

Ok thank you, great ideas! Now is there anybody else?

Boy 2: I think I would add more people so we could work faster, and better.

Well thank you so much you've been wonderful! We are done!

## 5<sup>th</sup> Grade Group 2 Transcript

Ok, how many do we have? 1,2,3,4, 5? Ok Awesome!

Ok guys I'm going to start with the first question and I want you to tell me your name and what your favorite subject is in school

Boy 1: My favorite subject is recess.

Ha ha ha that is great, ok thank you, next

Girl 1: My favorite subject is Reading

Girl 2: My favorite subject is Theme

Girl 3: My favorite subject is Swimming

Girl 4: My favorite subject is PE

Ok, great! Thank you, that went fast. Ok, now I am goin tg to tell you a word and I want you tell me what comes to your mind, the word is composting. What comes to your mind when you hear the word composting?

Boy 1: I think about plants, because compost is good for plants.

Ok thank you, anybody else?

Girl 1: I think in green, like brown

Ok, why green and brown?

Girl 1: Because like, green of trees and brown are related, like with the soil

Ok, the soil would be the brown?

Girl 1: yes

Ok, thank you, anyone else?

Girl 2: I think about help the world

Ok, how help the world, in what way?

Girl 2: Like recycling

Ok, so in a way is like recycling, can you say why are we recycling?

Girl 2: like the garbage

Ok, thank you very much

Girl 4: I think about planting

Why does planting come to your head?

Girl 4: Because with compost we can plant

Ok, good, thank you! Anybody else?

Girl 3: I don't know...

When I say composting nothing comes to your mind? It can be good or bad, it doesn't matter, just anything that pops into your head.

Girl 3: flowers!

Ok, alright! Thank you! Now I want you to tell me how do you feel about composting? It can be good, or bad, it doesn't matter, I'm not judging, I'm not grading, nobody is, you can say however you feel. How do you feel, do you feel good, do you feel bad, do you like it, not like it? It's all good, who wants to start?

Boy 1: I feel excellent

Why do you feel excellent? Can you explain?

Boy 1: Because I'm helping the world

How are you helping the world?

Boy 1: creating soil

Ok, by composting you're creating soil and you feel good about that?

Boy 1: Yes!

Ok, thank you! What about someone else?

Girl 1: I feel good because I'm helping the world and being a better person because by composting and planting the world can be prettier

Ok so by composting you can make the world prettier

Girl 2: I feel good

You feel about composting? Ok, why do you feel good?

Girl 2: Because I'm learning how to help the planet

Girl 4: I feel good because I like to do it (composting)

Ok, you don't mind the garbage and the waste?

Girl 4: No

Ok, thank you very much, anyone else?

Girl 3: I feel good, because it's fun and I'm helping the world

It's fun to do it with your friends?

Girl 3: yes, I like to do stuff with friends!

Ok, now I want you to answer, do you think composting is good for the environment?

Boy 1: I think yes

Ok, you think yes, ok raise your hands so that I can see who thinks composting is good for the environment (1,2,3,4,5) ok, everybody that's great! Ok, now can you tell me how is composting good for the environment?

Boy 1: Because we're making soil from garbage

Ok, thank you

Girl 1: I think because we're helping the planet and we're making soil

Now you guys are mentioning making soil. Good. Now what is soil good for?

Girl 2: mmm... for planting! Soil helps plants grow

Exactly, ok, thank you very much, anybody else?

Girl 4: Because with garbage we can make plants grow faster.

Ok, who else? How do you think composting is good for the environment?

Girl 3: Is good because I think that plants, flowers and the planet will be all better and beautiful if we use compost to grow plants.

Ok, thank you! Excellent, now, I want you to think before you didn't know what composting was or what compost was good for, before you didn't know that this was good, how did you feel about composting? If I were to tell you, that you were going to work with garbage but I didn't tell you why?

Boy 1: I would've said that I don't like that

Ok, so who else didn't like garbage?

Girl 1: Me (looking embarrassed)

Girls 3 & 4 both raise their hands signaling that they didn't like garbage before either.

What about the one who is not raising the hand?

Girl 2: No

No? How did you feel about garbage before you knew about composting?

Girl 2: I didn't like... well yeah I didn't like garbage before (everybody laughs)

Ok, so in a way do you think doing composting helped you to feel better about working with garbage and waste, you don't feel yuky anymore?

All students shake their heads

Is everybody saying no? (They all nod and say yes) Ok so in a way this activity made you change your mind about garbage? I want to tell me if you see garbage differently now?

Yeah! (all the students say at the same time)

Is that a yes in a good way?

Yes! (Everybody pulls up thumbs up sign)

Ok! Thumbs up! Thank you very much! Ok now question number 5. Have you tried talking to your family about composting at home?

Boy 1: I told my mom that composting was good and we could it our home to plant more plants.

Ok, and what did your parents say about that?

Boy 1: That it was a good idea

So have you guys tried to start composting at home yet?

Boy 1: Yes

And how is it going? What are your parents saying after you started composting?

Boy 1: Good, that is really good and we are helping the world

Ok, thank you very much

Girl 1: I told them that we were making a project to help the world that was composting , and now in my home we are doing it we have like two things and we are like going to use it to plant

Ok, you started classifying the waste to make compost in your house, to use for planting?

Girl1: yes

Ok thank you, what about anybody else?

Girl 2: I told them that we're helping the planet

Ok, so did they say they wanted to do composting at home?

Girl 2: well, I don't remember, but we could do it because we do a lot of planting in our garden

Ok, are you going to remind her again to compost at home?

Girl 2: yes

Ok, awesome, anyone else?

Girl 4: That is good that we're doing it, and maybe in the future there will be less toxic fertilizer to use for planting if everyone does it

That is awesome thank you, and are you guys composting at home?

Why do you think you haven't started?

Girl 4: Because we don't have the materials? (looks confused...)

Well, everybody's got trash

Girl 4: but there is not enough trash

Ok, good. You need to remember that there's not going to be enough trash in one day, and that compost is not going to be made in one day, so you need to start accumulating it. And remember compost doesn't stink if you do it correctly. I'm just giving you ideas, but it is good that you talked to your parents about it!

Ok, now someone said that they haven't talked to their parents about composting, is there any particular reason for not doing it?

Girl looks embarrassed

You think you might've just forgotten?

Girl nods

That's ok thank you!

Now who think composting is difficult to do where you live? And why is it difficult?

Boy 1: because there are a lot of cockroaches and rats near my house

Ok, that's a good point, anybody else?

Girl 4: because the yard is made of cement

Ok, you have cemented back yard? Ok, thank you, now last question, if you could change something about the way we did the composting activity what would you change and why?

Girl 2: I wish we had more time to dedicate to the project

Ok, great anyone else?

Girl 1: If more people come in and help we will have a bigger project and be able to make it better!

Ok so you think you need more people? Good

Girl 4: I say the same thing

Ok, why do you think you need more help? Do you need more help collecting waste, helping you put the garbage where it belongs?

Girl 1: We need help teaching kids where to put trash where it belongs, because even when we tell them they still don't understand

Ok, thank you those are all good ideas, anything else? No? Well ok, thank you very much and we are done! You've been great! You've been so good! You can go back to class now!

### 5<sup>th</sup> Grade Group 3 Transcript

Ok, my first question for you guys is I want to know your name and your favorite subject, please.

Girl 1: I like Theme

Girl 2: I like Writing

Ok, thank you, next please

Girl 3: I like Theme

Girl 4: I like Swimming

Girl 5: I like Theme

Boy 1: I like Theme

Thank you very much, that was quick. Now I'm going to say a word and I want you to say the first thing that comes to your head when I say that word. Whatever it is, doesn't matter if its good, bad weird, just whatever comes to your mind. When I say the word composting what comes to your mind?

Girl 2: Soil?

Ok why does soil come to your head?

Girl 2: Because when the browns and the greens, the leaves and the fruit peels and the stuff connects at the bottom of the bin you can see the dirt forming.

Ok, thank you, who else?

Girl 3: Garden

Ok why does garden come to your head?

Girl 3: because with the compost you can make gardens

Girl 5: I think of plants

Why do you think about plants?

Girl 6: Because I think about the outside garden

Girl 1: yo no tengo nada que decir (I don't have anything to say)... well, trash

Ok, so trash comes to your mind, that's perfect why does trash come to your mind?

Girl 1: I don't know, because compost is trash and dirt

Boy 1: I think of "Useful trash"

Well that's awesome why do you say useful trash?

Boy 1: Because we use trash bit it can be used to create trees and better things

Ok, well thank you very much! Now let's go the second question! How do you feel about composting? Do you like it? Do you love it? Do you hate it, not like it? How do you feel? It doesn't matter if it's good or bad, I doesn't matter I just want to know how do you feel about composting.

Girl 1: ehh I feel really excited

Why do you feel excited?

Girl 1: Because I get to work with my friends around the school

Ok, thank you, next

Girl 2: I like it, my job was to pick up the trash, put in the bin every afternoon and some mornings too, I really like it, I love to share with my friends

Girl 3: I like doing composting

Ok, why do you like composting?

Girl 3: Because it was exciting and we have to move the trash, and make bins and do a lot of work.

Boy 1: I like composting

OK why do you like it?

Boy 1: Because it was a great opportunity to help the environment

Ok, thank you very much!

Girl 4: I feel very good about composting I like it

Why do you like it?

Girl 4: Because we make compost and we put the trash in trashcans that it belongs to

Girl 5: I feel good and like it because I have fun with my friends and get to do something good for the environment.

OK, thank you very much. Now that I know that all of you have been working in the composting project BEFORE you knew that composting was good for the environment and before you knew that you were going to do it, If I were to tell you that you were going to work with trash how would you have felt?

Girl 1: I would feel very.... Eh....excited

Excited to work with garbage! Ok, thank you! Ok who's next?

Girl 2: well, first if you tell I was going to work with trash, I would've been like trash, really? (with a tone of disbelief) like the one that we put in trashcan, I would've been like, NO, but then when we were told that it was with fruit peelings and things we eat, I felt like Ok, I'll do it (seeming relieved) because is not disgusting, because that's what you eat and I felt like, really that's what you eat (seeming like its not so bad)

Ok, so before it would've been disgusting and now is not so bad?

Girl 2: yes

Thank you so who else?

Girl 3: I felt, like NO (shakes head, and seems disgusted), no because it would've been disgusting

Boy 1: Whatever it was told I would've been ok

You would've been ok?

Boy 1: yes (nods repeatedly)

Ok, anyone else?

Girl 4: I would've been ok

So you would've been ok? Ok, next please

Girl 5: I would not have been ok, because working with garbage is like getting dirty (seems disgusted), and I would've said no

Ok, well thank you very much! Ok did this activity about composting made you change your mind about how you see garbage? (Many say yes at the same time, but it is not clear how many)Ok can you raise your hands so I can see who is saying yes to the question? I see 1, 2, 3, 4, 5 I see 5 hands, is that ok? Oh ok, so I see 6 hands, everybody, ok! Thank you very much!

Ok so does, everybody think composting is good for the environment? (All of the students answer yes at the same time) ok, great! Now have you tried talking to your family about composting? (Many students scream yes) Ok can you raise your hand, it is ok if you haven't! Ok I see three hands! Great thank you! OK those who have talked to their parents, what have you said?

Girl 2: Well Gaby sent the information about and my mom read it she wanted me to talk to her about it, so I explained that we were going to use trash, and she was like TRASH (seeming surprised) and I told her not that type of trash, and that we're going it for the environment, and she asked if we could do it at home and I said yes, but it takes time.

So you haven't tried to start composting at home yet?

Girl 2: No

Ok, so why do you think you haven't started?

Girl 2: Well in my house we don't really have a lot of garden, but I've been learning bit by bit about it and now that I know more maybe we could start it after Semana Santa, I don't know maybe, we'll see.

Ok, great, thank you very much.

Now who else has talked to their family about composting?

Boy 1: I told them that, if we do it the world would be better and we would produce less garbage.

Ok, that's awesome thank you, what did your parents say about that?

Boy 1: That it would be great to start

Have you started yet? Did you start to compost at home?

Boy 1: Yes

What do you plan to use your compost on?

Boy 1: Like the trees and plants in our yard

Ok, who else talk to their parents about composting?

Girl 5: Me, I told them that it was like a project at school, so my mom asked and if we could do it in my house and so we could use it on the plants that are on my balcony.

Ok, so you say that you started composting at home?

Girl 5: yeah

OK, thank you very much! Now for those of you who haven't yet talked to your parents why haven't you talked to your parents about composting?

Girl 3: eh... I have talked to them but haven't done composting

Why do you think you haven't done nay composting at home?

Girl 3: I don't know

You don't know, that is perfectly fine, thank you! What about the others?

Girl 4: I don't know either, I think I forgot

Ok anyone else?

Girl 1: I forgot to tell my mom

Ok, that is perfectly fine, thank you very much. Now, does anybody consider composting something difficult to do? (All students say no at the same time) Ok, what would make you not want to compost at home? Is there anything that would make you not compost?

Students talk at the same time among them and all you can hear is "my parents are very busy, mine too, mine too!"

Ok so everybody's parents are very busy, that is perfectly fine. Now last question, I want you to think about the activity if there is something that you would want to change, or something that you would want to improve in the project what would that be?

Girl 5: (conversation is inaudible)

OK, wait, you said that would change the way the other students throw the trash in the trashcans? Every student says yes at the same time.

Girl 2: like 2 weeks ago we got the little trash cans for the fruits peels and stuff and we had to put the list what can go in them and now they know, but before they had no idea what to put in them

Girl 3: No they would put whatever they had in their hands...

Girl 2: The only one that really worked was the one in the kitchen, like the teachers are the ones that go in there and we put a poster on top and they know what to do, but now the little kids are getting better and better.

Girl 5: Yes we put posters, made announcements, like every Monday, I went like three times

Girl 2: yes and nobody paid attention, but when we put the list of what can be in the trash cans is perfect

Ok so you say that you would change the way you did that for next year so that in the beginning that works faster?

All at the same time (YES)

Is there anything else you would like to change?

(No) at the same time

Ok well that's all thank you very much you guys were great you can go to class now! Thank you!

### **5<sup>th</sup> Grade Group 4 Transcript**

Ok, the first question is easy, all I want you to do is each tell me your name and tell me what your favorite subject is in school.

Girl 1: My favorite subject is Theme

Ok, thank you, next

Girl 2: I like Reading

Boy 1: My favorite subject is Theme

Boy 2: My favorite subject is Theme

Girl 3: My favorite subject is Theme

Ok thank you, now we're going to move to question number 2. Now I'm going to say a word and I want you to tell me whatever comes to your head when I say that word, the word is composting. I want you to tell me what goes through your head when you hear the word composting.

Girl 2: gardening

Ok, so why do you think about gardening when I say composting?

Girl 2: because you can use compost to put in a garden and you can make compost with what's in the trashcan, I don't know

Ok, thank you, who wants to go next?

Girl 1: I think about, like, plants reproducing, because it's like a cycle

Ok, you think about a cycle, thank you, anybody else?

Boy 2: When I hear composting the first thing that comes to my mind is plants.

Why do plants come to your head when I say composting?

Boy 2: Because composting is like, eh I don't really know

That is ok, thank you! Anybody else?

Boy 1: I think like growing things, and planting.

Ok thank you very much, anybody else?

Girl 3: I think about plants and nature.

Ok, thank you very much! Now I want to know how you feel about composting. Do you feel good, do you feel bad, do you like it, not like it, how do you feel about composting?

Boy 2: I feel a little excited because composting is like, we need to come and work at school and all that stuff

Ok, so why do you feel excited?

Boy 2: because is like we're doing a good thing, we go around the school and put up the trashcans and all that



Ok so you're saying that you go around the school, so you basically like the working in groups, right?

Boy 2: yes

Ok, thank you! Who else?

Girl 1: I feel good because we're doing it for planting in the othr garden, and I feel good because I feel like I am helping.

Ok, how do you think you're helping?

Girl 1: Because the compost we're doing is going to another garden

Ok, thank you, who else?

Girl 3: I feel good about it

Ok, what makes you feel good about composting?

Girl 3: because I'm helping

Great! What are you helping?

Girl 3: the Earth

Great how do you think you're helping the Earth?

Girl 3: by making it more clean

Boy 2: I feel good because and excited because we're helping the Earth and we work in a group!

Girl 2: I feel good because we get to go and take away trash and make compost with stuff we can use from it.

Well thank you very much. Now I have a question I want to know if you think composting is good for the environment.

All students say yes at the same time

Ok raise your hands, 1,2,3,4,5, ok that is everybody, thank you

Now if I were to tell you before you knew anything about composting, think about before you knew that composting existed and that it was good for the environment. If I would have said or Gaby, well guys you are going to be working with garbage how would you have felt, before you knew about composting?

Girl 1: I would've felt excited

Remember this would've been before you knew that composting was good!

Girl 1: I would've still felt excited because I know that is new theme and I would be doing experiments, a new type of class

Ok, thank you how about everyone else?

Girl 3: I wouldn't want to do it (makes a face like she is disgusted by something) because garbage is gross!

Ok, thank you very much anyone else?

Boy 1: I would be happy because we would be doing new things

Boy 2: I would be ok because with so much garbage I know we're going to be wearing gloves or something

Girl 3: I would've asked you what is it that we were doing and I wouldn't like to do it (looks worried)

So basically now that you know that composting is good and it's good for the environment you feel ok working with garbage? You don't mind working with garbage now?

Many students say no altogether.

Ok, thank you, so I have one more question have you talked to your families about composting at home and about the work that you're doing?

Girl 1: I have talked to my brother about it because when we were signing the papers to talk to you on Skype and everything I told him what the project's about and my parents were not there but I could talk to my brother

Ok, so you haven't really talked to your parents about composting because they haven't been there, ok thank you

Girl 2: I have talked to my parents but the only thing I told them was about what it was not about trying to do it at home, we recycle...

So why do you think you haven't started composting at home

Girl 2: I don't know many things, because my parents are really busy and they're never there with me

Ok, thank you very much, how about someone else?

Boy 1: Just the time that they had to sign the consent form

Ok so you haven't really talked to them about trying to compost at home?

Boy 1: a little bit

Do you think that they would be willing to try composting at home?

Boy 1: I think yes

OK anyone else?

Boy 2: When we had to sign the papers they asked me what I was doing and I explained it to them and they were very interested in the compost project

And do you think that they would be willing to compost at home?

Boy 2: eh...kind of, because my stepfather always ... every garbage that is on the floor, or in the kittle garden that we have he puts in a pile

Ok, so you think that because he likes gardening he would be willing to try composting?

Boy 2: eh...kind of

Ok, how about anyone else?

Girl 3: I talked to them the time we had to get the papers signed

Ok so you haven't talked to them about trying to compost at home?

Girl 3: Well yeah but they say that would think about it

Ok, well thank you guys. Now next question, do you think that composting is difficult to do at home? What would make you not want to compost at home? Are there any reasons why you wouldn't want to compost at home?

Girl 1: Because I would like to but maybe sometimes it would get difficult because compost like you have to get the tools and all of that and maybe you wouldn't have time, but in school is cool I like it, but maybe at home we wouldn't have a lot of time

Ok thank you, anybody else?

Girl 2: Not really, because it would be almost the same as here and all it takes is you willing to take from the trash the banana peels and stuff like that and put in a pile and net around it die (students laugh)

Ok, make it decompose, right?

Boy 2: Not too much because all you would have to do it is save the banana peels and all other stuff to decompose in a different bin, right? (Seems dubious)

Ok, thank you guys. Last question is there something that you would want to change about the project what would that be and why? Or what would you add in order to make it better for next year?

Girl 1: I think I would go again to all the classrooms to tell the kids that go in the compost trash because there was a time that there was a problem because nobody almost put trash on the

compost trashcan, but now people are putting trash were it goes, and in the kitchen the teachers are putting the coffee grinds, and now is like working.

Ok so you would change that you would go more to the classrooms and explain how to put the proper garbage where it goes in order to compost right?

Girl 1: yes

Ok does anybody else want to say what they would change?

Girl 2: um I don't know really but maybe we could make more announcements on Mondays so that others know more about composting

Ok, so you would make more announcements on Mondays on Flag rising so that everyone would know more about composting

Boy 2: I would go to all the other classes and tell them to put more the "ensalada" (salad) leftovers, the apple cores in the compost trashcan so that there would be more "llena" (full)

Ok so that you would have a larger amount of garbage.

Ok thank you if you don't have anything more to add, we are done, thank you very much for being so good today!

## Appendix 27

### 6<sup>th</sup> Grade Group 1 Focus Group Transcript

So guys my name is Laura and I was a former teacher there. It's just 8 questions, you don't all have to answer all 8 questions, but I want all of you to participate and engage in the conversation. Try that when you answering a question, first you say your name.

Ok, can you all please tell me what your favorite subject at school is? What is the one you prefer the most?

Boy1: PE! I like PE.

OK, thank you

Boy2: I like PE.

Ok, thank you.

Girl1: I like Theme.

Theme! Ok, good!

Boy3: I like PE.

Girl2: I like Reading.

You like... Reading? (Difficulty to hear her answer) (Students were laughing amused at some comment running in the background)

What about you?

Boy4: I like PE.

You like PE too. Alrighty, ok, awesome!

Now, I know that you guys have been working on the garden and I wanted to know if you could describe how having this garden at school or at home could be used to help a poor community, or to help people in need? How do you think we could do that? (Students smile and look at each other waiting for the first answer) How does having that garden can help people in need, or a community that is in poverty?

Boy4: Maybe we can get a lot of resources to give it to the poor people, then we could make more gardens, for more resources, more food for the poor people.

Awesome!! Thank you! Anybody else?

Boy1: And we can also, like... but selling the food to poor people and help them with the resources, they can also be in a group and have a lot of fun.

That's awesome!! Thank you Marcos! Anybody else?

Boy1: YOU'RE WELCOMEEE! (Laughter in the background)

Girl1: I think that we can grow food for the poor people and with the money that we reach we can help them other times.

Ok, thank you Maria, good! Anything else?

So you guys tell me that is all about raising money to give to them back, and somebody said... Marcos talked about having fun also, but what about teaching? Do you guys think that you could teach other people to have their own garden so that they can produce their own produce too? How do you guys feels about that?

Girl1: Like Aldeas Infantiles?

Yes!

Girl2: I think it's a great idea! So yeah, so they can have their own food, their own garden.

Boy3: And by that they can, kind of, like, raise money, and...

Boy4: they can make a community!

Boy1: we can also give them, like an experience, like our good experience, that we've had. Awesome! All great ideas! Ok! So, no tell me how have you guys each have been part of the school garden? What have your roles been? If you have been involved, if you haven't been involved then just say "no I haven't had time", or whatever, it is ok.

Boy1: I've been in hydroponics, but it actually, they never kind of had any plants or that kind of stuff, but it was still really fun.

Ok but you learned about hydroponics, right?

Boy1: yes

Do you think that was valuable to learn to you?

Boy1: yeah

Girl1: I was in the recycle garden ... that was really fun because we used our discarded things that we had in the house, and we played and laughed. We learned how to... how to build a community.

Ok! Anybody else? How were you guys involved, Sidney how were you involved?

Boy2: I have the same, I am in the corner of Maria... in the recycled garden, I did the same thing (Gaby: it is not only what you did, is also what you're doing now)

Boy4: What I do now is actually plant, water, take out plants (all other say weeding at the same time)

Ok!

Boy4: Is like recycle, we...

Boy3: On Fridays we weed and some days we have to put nutrients, water and, yeah like...

Boy1: and like we are two 6<sup>th</sup> grades, we take turns of two weeks each, and on each two weeks two people from each group that are on the grade are going to, they go to weed, they water, and put the nutrients in.

Ok, so let me see if I am getting this clearly, only Marcos was part of the hydroponics and everybody else was part of the recycling garden?

Girl2: No, I was in hydroponics too.

Oh, so Camilla was in hydroponics too, ok. Camilla, can you tell me about your experience in hydroponics? Did you like it? Did you learn from it?

Girl2: Yes, I liked it and I learned from it. I actually didn't know that you could grow a plant, like when you grow in soil, that you could grow in water...

Yeap, ok. For the both that were in the hydroponics group did you guys think that it is useful to learn and it is useful to grow produce in hydroponics?

Girl2: yes

Why?

Girl2: Because, for example if you don't have a good soil where you live, or where you want to plant your plants, you can move it or you can do like a hydroponic.

Great! Awesome! Ok, next question. Do you think that having a school or home garden can be good for the environment?

Students all together answer yes!

Can any of you explain how this is good for the environment?

Boy1: Because we can help the... we help nature to grow plants and be more... (looks puzzled) and have a school that's, "como mas natural", more natural.

Alrighty anybody else? How is it good for the environment?

Girl1: it can be good for the animals we have in school and can... (stops talking and other students laugh)

Maria how is it good for the animals that you have in school? How are you helping the animals with the school garden?

Girl1: They sometimes eat our plants (students laugh), and I think that they feel really good about it! (She smiles)

Ok, are any of you guys aware of good farming practices? Or how like if you have a large terrain and then you have a lot of crops, what do you think that does to the soil growing vegetables, over, and over, and over, again in the same place?

Girl2: hum... I think is like, if you grow over and, over again, I think like the soil gets... "usado" Used up?

Girl2: and we won't have a lot of soil anymore.

Exactly, so how do you think that now having this school garden, if every school had a school garden and you could sell the produce at the schools, how would that help the environment? (students look at each other for answers)

Boy4: hum... maybe because all the schools maybe help it, like since the schools are separate the help the environment separately?

Ok, think in terms of the soil if we don't... if every school has a garden there's going to be less need to grow a lot in the same place so the soil will be...? (students look puzzled) Do you think we're helping the soil in other places, maybe?

Boy4: I guess...yes, maybe because we like, water soil, put nutrients in the soil, and the soil it helps the plants grow...

Boy1: and also helps our planet...

Girl2: I think that if the soil...uhmm.... With the nutrients we can use it again

Ok anybody else? Ok!

Boy4: Can I ask you a question?

Yes!

Boy4: Have you worked in a garden before?

Have I worked in a garden, yes I have! (Laughing) It's very laborious!

Boy4: Gaby got all dirty!

Boy1: I have another question! Do you speak Spanish?

Do I what?

Boy1: Do you speak Spanish?

Si, yo hablo Español! (laughs) Ok! Let's move to the next question! Have you talked to your parents or anyone else about having a home garden?

(all students say yes at the same time)

Boy1: THEY SAID NOOOO... (with an annoyed face)...well in my house I had a bean plant that gave beans, and then my brother fell on the yard, and it was bulls-eye!

Girl2: I had talked to my mom and she wanted to but all of a sudden she said forget about it, and then I talked to my grandmother and she has a garden but she only has plants, and flowers.

Ok so she only has flowers, but no produce, ok.

Girl1: My dad had a little tomato plant, and I don't really know ... (interviewer misunderstands what student said and this part of the conversation wasn't included in the transcript)

Ok why do you think your parents are saying no to the home garden?

Boy1: Because it is expensive, it needs space, well in my house I have a really big backyard but is expensive, and it's really hard to maintain it ... well in Summer we could, or in Christmas vacations but it's really hard to maintain it, and buy the things it needs.

Ok (students start to talk all at once)

Boy4: I have three dogs! And sometimes they eat plants! I have German shepherds, and he's is not the kind that will stay like this (still) he is crazy all day, and eats everything! (laughs)

So you think that they will ruin your garden.

Boy 3: I have a lot of plants in Jarabacoa, in house that I have there, and there is actually more space.

Are they growing anything in Jarabacoa?

Boy 3: Yes.

Like what are you growing produce, vegetables to eat?

Boy 3: Yes, like "plátanos" too...

Ok, is that for your family, or is that to sell

Boy 3: No, is like we are thinking to sell it, but is kind of now, is for like...

Is for your family?

Boy 3: Yeah!

Alrighty! Anybody else? What did your parents say Sidney? Oh Marcos sorry!

Boy1: I also have... I used to have a garden on my beach house that I have by (inaudible place) but it is a place that is like dry, and if you grow something it can die really fast... we have grass (laughs) and some plants that like, a cactus, but we don't have plants like, that we can eat, but I really want a very productive garden...

Ok! I understand... what about you Sidney?

Boy 2: My parents don't know because I live in a "residencial"... (runs out of words)

Ok that would be an obstacle, kind of, to live in an apartment? I want you all to think about this: Do you think that if you go to your parents again and tell them that you could use recycled materials, same way you're using in school and/or you could use hydroponics, do you think that maybe they would think about it, at least?

All at the same time: yes, probably.... (indistinct talking) I have bottles of coca-cola, 2 liters...

Girl2: I think my mom will like it, and she was thinking about it one time but she doesn't want to hurt herself again because she plants with my grandma...

\*\*\*19 minutes into conversation students already look tired and are losing focus on conversation)

Ok now last question! You've all been very, very, good! Now last question: If you could change one thing about the way we did this garden, what would you change and why? (Students look puzzled) If you could add something or change something for the garden or the way we did the activity, what would you change, and why?

Boy4: What would I change? I would change uhmm... the place that we like, planted because there are too many bugs, like how do you say... al lado de 2<sup>nd</sup> grade and 3<sup>rd</sup> grade and they like step on it and I see like bottles on the floor, or something, maybe they kick them... (conversation becomes inaudible)

Wait let me see if I understand you, you say that you would change the way you planted?

Boy4: No the place...

The place? The location of the garden? Why because the kids were stepping on them or moving things around?

Boy4: yes and like, on the side of 2<sup>nd</sup> grade and 3<sup>rd</sup> grade, and the dogs always step on them... and there are too many insects, you can see "orugas" .... Como se dice orugas? (asks questions to another student)... like worms, you can see little worms eating the little plants...

Oh there are caterpillars! Yes that would probably depend on the season and the type of produce you're planting. Ok! What else?! Good, thank you! (Girl2 (Maria) raises her hand) Yes Maria?

Girl2: I would change where is hydroponics in the “azotea” of... (Another student says roof! Roof! ... Her conversation becomes inaudible because of indistinct talking from other students in focus groups)

Wait, wait, let me see if I understand because you’re kind of breaking up. You said that would change the location of the hydroponics too?

Girl2: yeah, first it was on the roof and now is near the pool, but I see that when the kids go to the pool they splash water with bleach (chlorinated water from pool) and they kill the little plants.

Boy1: “el cloro” kills the little plants

Yeah, I know, I understand perfectly, is there anything else you might change?

Boy1: Yes, I think that it would be like, kind of good that the whole school had like... that we would grow more things, like watermelon, or strawberries...

Ok... Well strawberries, you know that strawberries are kind of for places like Jarabacoa, in cold climates, they wouldn’t do very good at the Community for Learning.

Boy1: Oh yes, yes, yes... (Gaby: More than what we planted...) yeah more than what we did. Ok is that all?

Girl2: I would change the nursery part, some of the plants are dying, and they get water and they get nutrients, but they still, like... they still aren’t growing more, I would change that in the design so it isn’t the shadow.

Oh, so the nursery is a shadow?

Gaby: Yes, the logistics of the nursery...

Oh ok, cause it’s like in a shadowed place and it doesn’t have enough sun to grow them maybe?

Boy4: It does, but they don’t last long

Gaby: do you want me to explain, or do you want them to explain... I don’t know if they know exactly?

No, that’s fine, if you want to explain that’s fine.

Gaby: Yeah I would agree with her that the nursery is an issue because they don’t grow much and not necessarily because of the sun but becomes a point where there’s too many together so we need to take them and plant them where they go, the nursery is not for them to grow is for them to come out of the seed.

Exactly, ok

Gaby: so we haven’t been putting them in their final location soon enough, so their growth is just stuck, you think? I don’t know... when they just stop growing?

... Yeah, because if there’s a lot of them all together they will be competing for space, for sunlight, for everything

Gaby: exactly so you can’t have them all in the sun for when they’re growing at that stage, so I think the location is not that bad, but the logistics is definitely an issue.

Alrighty

Gaby: I would add to that about the pesticides, yes, the whole pesticides thing, the whole logistics of when to pick things out when they’re done, when they’re ready to sell them, when to plant again, and all of that logistics is a hard thing, it has been the hardest, hardest, thing, and we are like making it up as we go.

Yeah, do you think that it would be a good idea to maybe bring back some of the experts to like, look around and say and maybe give you examples of when it would be good to pick what , or how to fix what...

Yes! (Gaby and students)



Gaby: we have and they've been giving us solutions, and we've been brewing tobacco seeds and spraying the plants, but you really have to be on top of it, and spray them every day, otherwise you just go and buy organic pesticides, which means a lot of more money spent on it.

Yes...

Boy1: Suggest a parent from 5<sup>th</sup> grade has a "vivero" nursery and I think, I think that maybe he would want to come.

Gaby: Do you want to invite him?

Boy1: will talk to Seferino...

So inviting him might be a good idea! Ok if there isn't anything else you guys want to say or add, then I think we are done! In less than 30 minutes I thank you, thank you all very, very much! You've all been great! Thank you very much everybody bye!

## 6<sup>th</sup> Grade Group 2 Focus Group Transcript

Hello everyone, my name is Laura and I'll be asking you a few questions, it's just 8 questions. I'm gonna turn my video off because it makes the connection very slow... Ok! Is that better?

Students: Yes!

Ok, good! So it's just 8 questions, so try to keep yourselves focused, and answer freely, there's no right or wrong answers. I want you all to participate, but please when you are going to answer please first say your name, and then you say the answer, ok? So that I can get to know each and every one of you, is that clear

Students: Yes!

Ok, cool! Now the first question is I just want you tell me your name and tell me what's your favorite class or subject at school?

Girl 1: My favorite subject is theme

Theme, ok... Now I need everybody's favorite subject

Boy1: I like theme, especially the last one we've studied "Space"

Boy 2: Theme

Ok, who else? (students starts to laugh) Ok, what is your name and what is your favorite subject?

Boy 3: My favorite subject is theme.

Boy 4:I like theme.

Ok, thank you! Now moving on to the second question, can any of you describe how having a garden at school or at home can be used to help a poor community? (Students look at each other) How can a garden at school, or at home can be used to help people in need? How do you guys think?

Boy1: well we can kind of, sell our produce so that they can food at low prices, and it would make their lives a lot easier...

Girl 1: Yeah, by selling what we grow.

By selling what you grow? (seeking confirmation, since audio wasn't good to understand)

Girl 1: yes.

Ok, who else? Anybody else? How do you think that you could help people in need with a garden, having a home garden or a school garden? (students are silent) Anything else? Think about "Aldeas infantiles" if you've been there of if you've heard about them? (students seem uninterested in the question) are you listening to me?

Students: yes!

Ok, good! So nothing else?

Gaby: what are you doing in Aldeas infantiles? Are you selling food to them?

Students: No!

Gaby: So what are you gonna do?

Boy1: We are going to help them with their project so that they can keep it up too, we are going to make them part of the project.

But how are you going to make them part of the project?

Boy1: By helping them and when we make money give the money to them and helping them buy stuff and grow food.

Ok are you gonna just help them with money or are you gonna help them in another way?

Girl 1: We are going to help them make a garden too, cause we are gonna show them how to put the plant in places, what to do with them, how to take care of their garden.

Ok so you're basically going to teach them what you've learned right?

Students: yes!

Alrighty, ok so is that another way of helping?

Students: yes.

Ok, now I want to know how each and every one of you has been involved in the school garden. What group have you been a part of? What have you done or what are you still doing for the garden? Let's start with Daniel. (Daniel looks puzzled and looks like reluctant to answer) It's ok if you haven't done anything, it's ok, I just want to know (Daniel starts laughing at something inaudible) what each and every one of you have done.

Boy 4: We help the plants grow by putting water.

Ok so you water

Boy1: yeah we have this schedule and every two weeks it changes.

Ok, so has everybody done their duty? Everybody's done something for the garden?

Students: yes! Yeah!

Ok, so what are you and Marcos doing right now Eduardo?

Boy1: Eh we water simply...

Ok, what about Joey, what are doing?

Girl 1: I've been putting nutrients on the plants and helping with the hydroponics, plant them, and also taking out all that's grown, and washing them and putting the price to sell.

Alrighty, ok what about Paul, what have you done?

Boy 3: I watered the plants for one week.

Ok, so you have watered, ok well it sounds cool! I'm glad everybody's working?

Gaby: Does that question refers to what they've done on the garden or what just taking care of the garden?

Just basically taking care of the garden, but I know that all of them have worked on the set up, right? They were all involved, right?

Gaby: ok, yes.

So I am taking that as a fact that they all worked on the set up, right?

Students: yes

Ok cool!

Now question number four, do you think that having a small home garden, or a school garden, like the one at the community for learning can help the environment? How do you think that your school garden is good for the environment? Or having a home garden is good for the environment?

Girl 1: I think that is good because plants recycle the air, and about the plants ... (asks another student something inaudible) ... ah, yah! We're helping deforestation because we are planting plants and (conversation become incomprehensible)

Ok, so basically planting is good because you're bringing in more plants and they're helping to clean the air, right?

Girl 1: yes!

Ok! Does anybody else have anything to add? (students look at each other as if looking for someone who wants to talk) How do you think having that school garden, or having a small garden at home is good for the environment? How are we helping the environment? (Marcos raised his hand)

Yes Marcos?

Boy 4: Because we're planting more plants, we're being green, like I've heard we have "green thumbs"

Ok Daniel. Now what about the soil? I want you guys to think about the soil, think at large. If you want to produce let's say bananas for the Dominican Republic, you need to have a lot of banana trees, right? (Students nod and stare at each other) Imagine what all those banana trees are doing to the soil. They're getting the nutrients out to grow the bananas right? So what if after those banana trees are done you want more bananas, you want to keep producing and producing. If we are producing all the time what's going to happen to the soil.

Boy1: Well I think that is a cycle, when a plant dies it kinds of rebuild the soil, and puts in more nutrients to keep growing.

Ok but think about, you're having bananas, and you need to have them all the time, you need to grow, grow, grow, grow, at one point the soil is going to be... How do you think the soil is going to be?

Yes Marcos?

Boy 2: out of nutrients?

Out of nutrients yes! So how do you think that having your garden, and if every school has their own school garden, how do you think that would be good for the soil? (students look at each other looking for someone who answer)

Boy1: Well I think that we could put nutrients, if we put nutrients, and water and mix it, and it will mix with the soil.

Ok, thank you! Now I need you to think about this, we're growing plantains, we're growing bananas, we're growing rice, we're growing beans, we're growing a lot, in a lot of places, so this means that the soil is suffering a lot, so each school had their own school garden it would be beneficial because there wouldn't be a need to grow so much in all other places. Are you guys with me?

Students: yes!

Alright, cool! Question 5: Do you think that having a school garden can help people in need? How? Don't tell me the same thing you told me before, how specifically can having a garden in a house can help people that are poor?

Girl 1: Well for one, they won't have to pay for food, they would just have it right there. They would just need the seeds for it to grow. We can also sell some of what they grow.

Exactly! Awesome! Anything else? No? Ok. Question 6: Have any of you talked to your parents or anyone else about having a home garden?

Girl 1: Yes I have! (students talk indistinctively)

Ok raise your hands if you said yes, if you have talked to your parents. Daniel I can't see your hand, is your hand up?

Boy 4: No.

Ok, alright, cool.

Now, Daniel you haven't talked to your parents about having a home garden. Why is that? And that is perfectly fine. I just want to know why haven't you, did you think about it or you didn't want to?

Boy 4: No, because I live in an apartment.

Oh so you live in an apartment. So do you think it would be hard to grow things in an apartment?

Boy 4: Yes.

Ok. Now all of you who spoke to your parents about it, what did your parents say?

Girl1: They said it was very cool, because my mom already started growing plants and she really likes them so when I told her about the garden she was really excited, and now we have beans and flowers in our yard.

Ok so now you're growing beans? Great

Boy1: Well I talked too and I grew beans on a flower pot, and we only grew beans but I picked them before time, because I thought they were ready.

Did you plant a lot of them or did you just plant one?

Boy1: Like 5

Ok, and you did it in a flower pot, right?

Boy1: Yes.

Ok, cool. Ok, Paul, have you talked to your parents?

Boy3: Yes.

What did they say?

Boy3: My dad... he used to do it, he used to, but he stopped because they're building in my house, but we are going to start in the roof.

Ok, so now is not a good time because you're rebuilding you're remodeling, right?

Boy3: Yeah.

OK, what about Marcos? What did your parents say about growing, or planting at home? (Seems not to understand the question, I proceeded to translate into Spanish) "Que te dijeron tus padres de si podrias sembrar, tener un jardin para sembrar, o no?"

Boy 4: Yes

They said yes? Have you tried growing anything yet?

Boy 4: Not yet.

Ok, would you be taking care of the garden or would your parents be helping you?

Boy 4): Los dos.

Ok good! Now the last question, if you were to change one thing about the way we did the project, the school garden, what would you change? Is there anything you guys would want to change or add to the activity? (Paul raises hand)

Yes, Paul?

Boy 3: we should put more time into planting here.

Girl 1: Me and some of my friends think that we should put more time into put nutrients and stuff like that, because sometimes we go to the plants and we find them dead or that not have grown after a week of putting nutrients and stuff.

Ok, good anything else?

Boy1: No

No you wouldn't change anything Eduardo, everything is cool?

Boy1: Yeah

Daniel?

Boy1: Well, we would try to make it better, like try to find more space

Ok, Daniel, Marcos, there is nothing you want to change or add?

Daniel and Marcos: No

Ok, well thank you very much we are done! You've all been great! Thank you so much! By have a good day everybody!

### **6<sup>th</sup> Grade Group 3 Focus Group Transcript**

Hi everybody, I'm Laura, I'm going to have to shut the video down because the communication gets very slow, but I just wanted you to see who you were going to talk to, ok?

Students: YES!

Ok, I want everybody to participate, this should be fairly quick if you all stay focused I want all of you to participate and try to answer at least one of the questions, it's going to be more like a conversation, there is nothing you should be worried about, nobody is gonna grade you on this, so let's just be honest and try to have a conversation ok? Are we good?

Students: Yes

So let me start by asking you your names and you can tell me what is your favorite subject or class at school? (Students look at each other and start laughing all together) Ok, who wants to begin?

Girl1: My favorite subject reading

Ok, next?

Boy 1: My favorite subject is Theme

Good, who else?

Boy 2: Theme

Ok, who else?

Girl2: my favorite subject is theme

Theme, yay! This is all theme people! Ok who else?

Girl 3: My favorite subject is Art

Art, ok

Girl 4: My favorite subjects are Reading and Art.

Ok! Thank you very much! Now before you answer the following question I want you to before you answer say your name first so that I can identify everybody ok?

Ok, can you describe how having a garden at school, or having a garden at home can be used to help a poor community, or how can it be used to help people in need?

Girl 1: It can help because a lot of food in the super market is expensive and many people can't afford the food so we can sell it at affordable prices for them.

That is a very good idea, thank you. Anybody else? How else do you think? (students look puzzled and stare at each other looking for anyone with an answer) Think of Aldeas Infantiles, what can you do for them?

Girl 4: We can do, like help them also make their own garden, there are also going to sell their food.

Ok so you are going to help them learn how to make their garden? Is that what you're suggesting?

Girl 4: Yes!

Ok, and how would this help them? How would having a garden help them?

Boy1: By not, like wasting money, eh let them sell the food that they have

Ok so that would be a way for them to make money out of what they grow?

Boy1: Yes

Ok and what else could they do with this produce that they grow?

Girl 1: They can eat it.

Yes, exactly. It wouldn't only be for sale but, also they could eat it themselves, right?

Girl 3: A little bit of what they grow they can sell it to have money for them.

Great, all great answers, anybody want to say anything else? (Students look at each other) No?

Ok, so moving on to the third question. I want to know how each of you has been a part of the garden project. What are you doing right now? What have you done so far? I am assuming that all of you took part in the planning process, but I want to know what you are doing right now to help with the project.

Boy 2: We're giving the plants nutrients and watering them so they can grow better.

Ok

Girl 4: we are weeding and watering.

Girl1: We are keeping them so it could be like a cycle and we can keep growing vegetables.

Ok, so you're trying to make it sustainable, to try the garden to keep growing vegetables every school year. Is that what you're saying?

What are you doing?

Boy 1: I'm watering the plants and weeding them, and cutting vegetables "pa' ir los a vender" (to go sale them)

OK

Girl2: We do weeding every Friday, every Tuesday we put in nutrients, and we water every day.

Girl3: I did the same, I water, I weed and I put the nutrients in.

Has anybody been involved with the hydroponics in this group? (Some students raise their hands 3/6)

Ok, good. Now moving to the next question, how do you think having a school garden or a home garden can be good for the environment? How are we helping the environment by having a school garden or a small home garden?

Girl4: Because we are using the things that we would throw out, and we are using it for a good thing like planting, like growing vegetables.

How else? How else do you think that having a school garden would help the environment?

Boy 2: It helps to clean the air

To clean the air because we're putting out more plants, right?

Boy 2: Yes.

Boy1: Making a community

Because we're building a community, great! How else? I want you to think big, I want you to think how we get our food from the supermarket and they come from large plantations and what happens to the soil in those places when they have to grow, and grow, and grow, and grow, what do you think happens to the soil?

Girl 1: The soil isn't good anymore.

Exactly, why isn't the soil good anymore? What happens to the soil when you grow, grow, grow so much?

Boy2: the soil is used up and then it can't grow plants again.

Exactly nutrients aren't available anymore, right? And there is a lot of things associated with that, so I want you guys to think about that. Anybody wants to say anything else? Ok, Now I want to know have you talked to your parents about having a home garden?

Students: Yes!

Raise your hand if you have (4/6)

Now I want to know what did your parents say when you talked to them? To the ones that raised their hands.

Boy 2: They liked the idea.

Ok, have you tried growing anything yet?

Boy 2: No

Ok why do you think that you haven't started?

Boy 2: Well... I don't know... We're going to start soon....

OK

Boy 1: My dad wanted to learn because he likes the plants.

Ok, so your dad wants to, have you tried to grow anything yet?

Boy 1: yes

What did you try to grow?

Boy 1: mmm... I planted lettuce... but they died (looks embarrassed)

Ok, that's ok! Do you live in an apartment or in a home? (meaning house)

Boy 1: In a home

So you did it in the back yard?

Boy 1: yes

Alrighty, good job!

Girl 1: My parents thought that it was good for the environment.

Ok, that's great, have you tried growing anything yet?

Girl 1: No

Why do you think you haven't started yet?

Girl 1: Because there's not enough space

Do you live in an apartment?

Girl 1: No

You live in house?

Girl 1: yes

Do you have a back yard or affront yard?

Girl 1: I have a backyard but is with cement.

Oh, so is cemented, ok.

Girl4: My parents thought it was a great idea and that maybe we should come to school and buy some of the things we've grown. I haven't tried to plant yet because I live in an apartment and I don't have any space.

Ok. Have you guys considered, to those that live in apartments or have a cemented back yard have you guys considered hydroponics, or maybe something in a balcony or something in a window, something small like an herb garden?

Boy2: yes, my mom said that she wanted to buy a raised bed

Ok, for the two girls that haven't talked to their parents, why haven't you talked to your parents about having a home garden? (girls look embarrassed) And that's ok! (girls laugh) I just wanted to know why?

Both girls look at each other laugh, and say “I don’t know” at the same time. Ok, that’s ok, it just didn’t cross your mind the idea? Both girls answer no at the same time. Ok, that is perfectly fine.

Do you enjoy being part of the school garden having the school garden? Do you like it?

Both girls answer yes at the same time.

Ok, then that’s great. Last question, if there was anything that you could change about the way we did the school garden what would you change and why? Students look puzzled at each other... Or what would you add, or what do you suggest? Students still look like nothing comes to mind... Do you have any ideas for next year?

Boy2: Maybe the plants could be a little bit closer together so that people don’t forget to water them because they don’t see them.

Ok, have there been issues where people forget to do what they’re supposed to do, like watering, put nutrients in, weed, etc.?

All students say yes at the same time... Some look down, or up...

Ok, it happens. Anybody else have any suggestions ideas?

Something that they want to make better? All look to different places or some shake heads.

Ok so you guys would pretty much keep it as it is, right?

All say yes at the same time, some shake heads in agreement.

Ok, well thank you very much this is it, thank you so much for being so good!

### **6<sup>th</sup> Grade Group 4 Focus Group Transcript**

Ok guys! My name is Laura and let’s move on to the first question. For the first question I want you to each tell me your name and tell me what your favorite subject in school is.

Boy1: My favorite subject is Reading

Ok, thank you very much

Boy2: My favorite subject from school is writing.

Ok thank you, who else?

Boy 3: My favorite subject in school is Science

Ok, thank you

Boy 4: My favorite subject is Reading and Theme

Boy 5: My favorite subject is Theme

Girl 1: I like to write

Ok, that was the first question, thank you very much. Now I want you to tell me can you describe how having a garden at school or at home can be used to help a poor community people, people in need?

Boy1: We can help, like when we plant we can sell them at lower prices than what they sell in the store. We have planted some, corn, spinach, lettuce...

Ok you could sell what you produce, at lower prices than the stores, that’s great. How else? How else do you think having a school or a home garden can help us help people in need?

Boy 2: I think that we could help poor kids, like... We can help them make their own garden, in other places, like we’re doing right now at Aldeas Infantiles

Boy 4: And also it’s a fun thing to do, getting other people involved, and they are building a community and the whole community could help, they would be tied to the garden, and the garden could help them connect with other communities, like us and Aldeas Infantiles.

Thank you, that was awesome!



Boy 1: and also when they have their garden they could use some of what they grow, and sell some to keep the garden going next year.

Ok! Thank you very much! Now I want to know how has each of you been a part of the garden? What have you done, or what are you doing now?

Boy 4: Lately I've been really helpful with the weeding, and just helping out.

Ok who else.

Girl1: I've watered the plants every day, and de-weed and putting nutrients in.

Boy 5: I helped to pull the stuff out to sell it to the teachers and parents. So with that money we can buy more seeds to keep growing vegetables.

Ok so you've helping in the sales team, ok, anybody else?

Boy 1: I have done plenty of things like, almost everything, I've been watering plants, I've been weeding, I've planted a lot, I like working in anything that's good. When I like it I work even harder.

Ok, well that's good!

Boy 3: I've watered the plants, and I work in the community garden and I check on the tomatoes, and if I see a weed I pull it out.

Thank you

Boy 2: When I go to the garden and if I see that the plants are ready I pull them out, and I've put in nutrients so that they can grow better so later we can sell them. We actually have 5 or 4 tomatoes each day!

Wow that is great! Thank you guys!

Now do you think that having a garden in school or at home can be good for the environment?

All students respond yes at once

Now how do you think that the garden is good for the environment? How is it good? Can you explain?

Boy 5: If we grow more plants it can help the pollution and we can live more.

That we can help pollution how?

Boy 5: Like making it go away.

Ok, so where pollution where?

Boy 5: Like in the air

Ok, thank you that's awesome

Boy 4: Because our garden is really, really completely natural, also, other gardens put growth hormones in so that the produce can grow much better, and so we are not doing that we just put nutrients and we let nature take care of it.

Ok, so you say that the garden you're doing is natural, and that you don't put any artificial things for the vegetables to grow. Ok, so the nutrients are organic, ok that is great!

Boy 4: Instead of pesticides we used organic pesticide from tobacco seeds

Ok, so now I want you to think bigger. I want you to think about the soil. All the food that you buy at the super market comes from plantations where farmers grow in large terrains, and they grow vegetables over, and over again. What do you think that that does to the soil?

Boy 1: It gets drained, and dried out, so the soil is not like, healthy anymore

It gets dried out, and it loses all the nutrients, right? So what do you think would happen if every school decided to have a school garden, how would we be helping the soil?

Boy 1: We'd be helping because if they do it naturally, I mean, not organically they would damage everything, the plants, the soil, everything, and that would be like... I don't know how to say this...

You can say it in Spanish

Boy 1: ... I don't really know the words to say it in Spanish

Ok then, let me know if someone else has something they want to say and then I'll come back to you, to see if you remembered, ok?

How do you think that if every school had a garden, how would we be helping the environment? If every school had a garden like yours, that's all natural?

Boy4: Well all the produce would be so much fresher, and also we would support life for worms, and other animals, and things that live in the soil.

Girl 1: We'll have more green, and earth

Ok, so the soil would be more, and better, is that what you are saying?

Girl 1: I don't know...

You're not sure? That's ok, that's fine!

Ok let's move on to another question. Have you talked to your parents or anybody else about having a school garden or a small home garden?

Boy 1: Ok I have talked to my mom and told her that we have a garden and that is completely natural. When she came to get the report card she saw it and she was really amazed for all the hard work we did

So what does she think about you starting a small garden at home?

Boy1: mm, I haven't really tried because I don't really have the space to do it, but if I had them I would do it

Ok, so do you live in an apartment?

Boy 1: no I live in a house

Ok so you don't have back yard to start maybe a small garden?

Boy 1: yeah, I do but, it's really small, and it has a floor, not grass...

Oh ok, so it's cemented or it has tiles?

Boy 1: yes

Ok who else?

Boy 2: I didn't talk to my parents, but I talked to my cousin, and he was going to share it in his school to see what happens, he is at Lux Mundi, and that was like a week ago, he said that it was very cool.

Ok, great! Now why haven't you talked to your parents about having a home garden?

Boy 2: I have! I've talked to my mom several times, I already have told them I want garden right now!

So are you trying to grow anything at home?

Boy 2: Not yet, we don't really have enough space...

Do you live in an apartment?

Boy 2: No, I live a house

Do you have backyard or a front yard?

Boy 2: I have both, I mean the front yard is made out of cement and the back yard is made out of grass but it's like, mmm..., is only 6ft long.

Ok so your parents think that there is not enough space to grow things at home?

Boy 2: yes.

Ok Thank you! Ok anybody else?

Boy 4: Although I haven't suggested (a garden) at home, it's like I have a big garden it's filled with leaves, and it's not very flat or leveled, so it would be really hard to grow a garden, and we also don't have much time to do it at home.

Ok, but did your parents like the idea?

Boy 4: Yeah! We have another house in Samana, and we have like a bunch of stuff growing there.

Boy 3: Yes I actually talked to them on the very first week. We have back yard but we have a lot of plants growing in there already, not edible, only one is edible "platanos".

Ok thank you, anybody else?

Girl 1: I told them when, I think it was the first days of the garden, and I told them we were doing a garden, and a few days later I started to grow some bean in my house.

So your parents liked the idea of having a garden at home?

Girl1: I think they liked it yes.

Ok, thank you. How about anybody else?

Boy 5: I told my mom and dad and they told me that it was pretty cool that we were doing a garden, and that we could help the environment by that, and they said that I could plant stuff at my home.

Ok, that's great so have you started growing something at home?

Boy 5: Yes I have, I'm growing lettuce and tomatoes.

That is so great! Thank you very much!

Now the last question, if you could change one thing about the way we did the garden this year, in order to make it better for next year, what would you change? What would you improve?

Boy 5: I would change the location of some plants because they are close to the cars that pass by and the smoke is getting to the plants.

Boy 4: I would change the location too, of some plants like corn, because it is getting too tall and doesn't fit where we planted them, and everything else is filling up too.

Girl 1: I would change the place because the dust from the construction next door is getting to the plants

Boy 2: I would leave it how it is right now and just make it prettier, like right now is ok, but we can make it better like fix it up and paint it better.

Ok, thank you anybody else?

Boy 1: I would change the place where some of the things are planted now, because I don't like it.

Ok why don't you like the places where things are planted now?

Boy 1: well because they are all like sticking together, there is little room for things to grow

Ok, thank you! Anybody else wants to say something?

Boy 3: I would change the nursery to an area with more sunlight and also the ones near the soccer field because sometimes the kids kick the ball and it lands on the plants.

Oh, ok, thank you very much! You guys have been great! You can go back to class now! Thank you! Bye!

## Appendix 28

### 7<sup>th</sup> Grade Group 1 Focus Group Transcript

Ok guys the first question is you will tell me your name and the subject that you enjoy the most in school please.

Girl 1: My favorite subject is I don't know, I don't have one I think?

Ok just say the one you dislike the less. You don't like anything? (Students laugh) If you don't have a particular one that's fine we can just move on to another person

Girl 2: My favorite subject is LA

Girl 3: My favorite subject is LA

Girl 4: My favor subject is LA

Girl 5: My favorite subject is History

Ok so thank you, there's going to be a lot of feedback I'm going to ask you to repeat, and please say your name before you answer and come close to the computer so that I can hear you.

Connection is really bad and volume is too low.

The second question can you explain what you understand for solid waste, trash or garbage what do you understand that is?

Girl 4: I think that waste is things we produce

Ok do you mean we produce through an industry or naturally or both?

Girl 4: Both

OK thank you anybody else?

Girl 1: things that people buy or use and then after they're done using it we throw it away

Girl 5: I think waste is things that we don't need anymore, things that we don't use

OK, is that everybody? Is there is someone that doesn't want to answer a question is fine? Does anyone else have anything to add? Ok, I see that not many of you want to answer that question and that's perfectly fine, let's move to another question then. How do you think solid waste affects the environment? How do you think that garbage, trash affects the environment?

Girl 4: I think that the environment is not used to having things that aren't living ...

Ok so you're saying that the environment is not used to having trash in the surroundings, is that what you're saying? (Loose connectivity)(Have to shut the video off in order to finish the conversation so that we don't lose connectivity so often) How do you think that trash or garbage affect the environment?

Girl 3: I think that trash affects the environment because it can affect species, and make them go endangered, and because of urban expansion

Ok so you're saying that urban expansion brings waste to the environment?

Girl 3: Yes

Girl 2: I think that it affects the environment because of overpopulation because trash occupies space

Yes, and now that you've mentioned overpopulation does it mean that when you have more people you have more trash is that what you're saying?

Girl 2: Yes because the more people there is the more the consume so there is more trash

Now think about what that trash would do to the environment?

Girl 2: Global warming, the greenhouse effect

Ok, great now how are those related to waste and garbage? That's a very good answer I just want to see if you can explain the relation between global warming to overpopulation and having more garbage or more waste?

Girl 4: Because there can't be an improvement if there is overpopulation and trash involved because if we don't know how to deal or manage the trash nothing will get better

Ok so you think we need to manage the trash better so that we can have less impact on the environment? Is that what you're saying?

Girl 4: Yes

Ok, anybody else as anything else to add about how waste and garbage affect the environment?

Girl 1: I would like to add something, we have two trashcans in my home because... well I want to give an example that when somebody throws a bottle in the beach or in the ocean the fish can get trapped into it and die and all that ...

Ok yes, there are many, many ways in which garbage can affect many different ecosystems I just wanted you to see if you could talk about it in general. That's good anybody else?

Girl 5: yes, that also that what we do with garbage isn't good because we throw it in ocean, we leave it in the street, if we don't recycle, I mean if we all recycle and do the proper things trash wouldn't be a big problem.

Ok so you think that we manage garbage better, if we didn't put it in the street, if we collected and put it in a safe place, that it would be better for the environment?

Girl 5: Yes

Ok thank you anybody else? Ok so let's move to another question? How do you think that reduce reuse and recycle can decrease the amount of garbage we produce.

Girl 1: I think that reuse when you're drawing on a paper you can reuse it on the back, like

Ok so using both sides of the paper to draw

Girl 1: Because kids sometimes get tired of using the same paper and throw it away, what they can do is just use the back side and that would create a smaller amount of trash, and recycle like eh put a plant or something... (Runs out of words)

OK, you said a bottle can be used to put a plant in it is that what you said?

Girl 1: yes

Ok, would that be reducing, or would that be recycling? (Girls begin to discuss with one another about which it is, some say it could be both some say it is recycling) Ok are we having a discussion trying to figure out which one is reducing and which one is recycling? That's ok! (students stop talking and no one volunteers to offer the answer.)

That's OK, listen when you recycle something it means you're giving it a second life it means you're going to turn that material into something else. So if you have a soda bottle and you cut it in half and put plant in it, it is still that same soda bottle but you're using it for something different, do you see where I'm going? (students say yes) So that would be reusing because it is still the same thing, it still that soda bottle that you just cut up in half. Now if you took that soda bottle to a recycling center that would be processed again to make another thing, that's the difference between reusing and recycling.

OK does anybody else want to say how reducing reusing and recycling can reduce the amount of waste?

Girl 3: I think that we can reduce, eh we can decrease the amount of garbage, because part of that garbage will be recycled and the garbage would be less, if we make other things out of it

Ok can you give me an example in your life where you can reduce, reuse or recycle? What can you use less of? What can you recycle? What could you reuse in your daily life?

Girl 3: we can reuse the paper, and plastic soda bottles and stuff like that

OK anybody else?

Girl 2: I think that reduce, reuse and recycle can decrease the amount of garbage because some material we use takes a lot of time to be produced, so if we recycle it or reuse it again, we are saving it for another time, or giving it time to be produced again

OK I'm not sure if I understand what you're saying. Can you try to explain it again please?

Girl 2: I think that reduce, reuse and recycle can decrease the amount of garbage that we produce because there are some materials we produce that take a lot of time to be produced, and if we reuse and recycle more we give it like time to make more, and... (seems confused and lots for words)

Ok I think I see where you're going, you're saying that there are materials that take a lot of time to produce and a lot of energy while they're being produced, so when we reuse and reduce the use of those materials we are actually not having to buy as much and therefore not creating as much garbage? Is that what you're saying?

Girl 2: yes

OK, anybody else? OK so let me move on to another question. Did the garbage project change your mind about the way you and your family take care of and deal with garbage? (All five students say yes at the same time) OK, I want you tell me how did the garbage change your mind about the way manage garbage in your house, or about the way you dispose of waste in your house.

Girl 4: It changed my way of thinking by me seeing all the amount of trash that we throw in our environment and I try to change it by not trying to waste so much paper.

Anything else besides paper that you noticed your family was consuming a lot?

Girl 4: Bottles

OK like plastic bottles?

Girl 4: yes and I gave them an idea of using a thermos instead of buying bottled water.

OK, thank you anyone else?

Girl 5: Yes I noticed that we used a lot of food for so few people

OK, so you noticed that you cooked more than necessary and that in the end you have to throw away, right?

Girl 5: yes

Did you talk to your parents about it and or gave them an idea?

Girl 5: I told them that I don't eat in the afternoon so why cook food for me, so I told them instead of cooking 4 pounds to just put 2, and to reduce the amount of food per person

OK, that would ultimately reduce the amount of food related waste you produce?

Girl 5: yes

Ok thank you very much, anyone else?

Girl 3: Yes, now I am more conscious of what I am throwing in the trashcan and thinking of what more would I do.

Ok besides being more conscious have you talked to your parents about stuff that you might want to reduce the use of or recycle at home>

Girl 3: Not really because we don't have a lot of time to talk.

Ok so you don't have a lot of time to talk to your parents?

Girl 3: Exactly

Alright I suggest you guys find some time, because is just going to get harder and harder. Ok thank you, anybody else?

Girl 1: I always knew about the trash problems and it (the project) changed my mind a little bit but I am still doing the same, and I never thought that I could save much paper or all that so I am still doing the same

Ok so you're saying that still think you waste a lot of paper like you used to?

Girl 1: Yes

Why do you think that can't reduce the amount of paper you use?

Girl 1: Well first of all I have to go to the bathroom, and when I have to go...

Yeah, we're not talking about toilet paper...

Girl 1: When I was smaller I wasted more paper, but now I don't paint a lot and all that and, is that... I don't think I can... I don't know, forget it

Ok, it's ok. I am getting is that you don't think you contribute enough to garbage right? That you don't really produce all that much garbage right? Is that what you think?

Girl 1: Yes, because there are more people in this world...

Yes, definitely is not just you it's all of us, it's a problem of all of us and we are all involved, and you might think that you do not contribute to the problem as much as other people, but there will be and there are a lot of other people who contribute to the problem more than you and your family, but we can all do something, and we are not talking about you using less toilet paper, because we need to go to the bathroom, but for example when we go to the super market we can use reusable bags so that we don't have to use plastic bags. Is like instead of buying bottled water why don't we carry a thermos? Is things like that I wanted to know if you were thinking about. It can be really limited when you only think about one thing, for example I know a lot of you like to drink those bottled juices, Gatorade and stuff like that when the natural stuff produces degradable garbage. If you squeeze an orange to drink orange juice, you don't need to buy the bottle. Of course it's a lot more work, but it will reduce the garbage you put out.

OK anybody else or should I move to another question? (students say another question all at once), ok has the garbage project caused you to make changes in what you and your family do with your waste? Do you do something different now than before? Besides what you've all said about not using as much paper and bottles and all that, have you actually made a change?

Girl 3: Now I have more control on the things that I do that I know might be harming the environment

Thank you very much, anybody else?

Girl 4: We have changed by reusing the bottles and not using that much paper

OK, again, thank you very much, no last question... If you could change something about the way we did the project with Yvette what would you change and why?

Girl 4: I think that if the country would recycle that it would make great difference

Ok, you do understand that if we want the whole country to recycle we need to start by doing it ourselves? (Students say yes at the same time) Alright, well that is something for you to think about for later ok? There are recycling centers and the school collects paper and bottles, you can go ask 4<sup>th</sup> grade and they collect it at there is a truck that takes it to a recycling facility, where you aware of this? (Some students say yes at the same time so if you are aware of this) then why haven't you brought your recyclables from home? Why are you not bringing news paper, cardboard boxes etc. so that they can take it to the recycling center? (Students start arguing amongst each other saying they didn't know, we did know...)

Girl 1: We didn't know how to be involved and I didn't know where recycling centers are, you know...

Yes I know that not knowing where the recycling centers are can be a big deal but go to 4<sup>th</sup> grade they are collecting stuff to take it to the recycling center, so you can start by bringing stuff from home that can be recycled.

Girl 1: I think we do a little bit of recycling because the colmado comes and picks up the water bottles (another student tell her that is required to have the old ones or you pay more)

Yes, but we need to do more...Ok, now if you wanted to change something about the project what would that be and why?

Girl 5: I would love to skip the part of look in the garbage, but if you don't do that then you can't really know what's inside it, but I don't think I would change anything because you need to do all of those things to actually, "comprender" (understand).

Ok

Girl 3: I think I would change the part about checking the garbage every day, and maybe do it after the whole week because every day the nurse that works at my house would always throw it out, so it would be better to it after the whole week passed.

Ok you need to keep in mind that if you save garbage for an entire week, your house is going to stink like crazy, and your parents are going to want to kill the teacher

Girl 5: What if you change it to every time you put something in garbage you write it down

Ok but what happens when you're not home to write it down, you're not home to look at it, that is why said you needed to talk to the person that was in your house in charge of that, did you do that? (yes) if you did that and people didn't throw the garbage until you came then you should've had a good amount of garbage per day. Ok so is there anything else that you would want to change? (all students say no at the same time) Ok do you have any questions comments or suggestions, those are all my questions.

Thank you, good bye!

## **7<sup>th</sup> Grade Group 2 Focus Group Transcript**

OK I have 7 questions for you guys today. There is no grade nobody is going to see this, it should be quick if you focus. I want you guys to tell me your name and subject you enjoy the most in school.

Girl 1: I enjoy Language Arts

Girl 2: I like Science

Boy 1: I like Science

Girl 3: I like LA

Girl 4: I like LA

Girl 5: I enjoy LA

OK so question number 2 can you explain what you understand by solid waste, or garbage, what do you think that is.

Girl 4: garbage is things that people don't want anymore

Girl 5: Things that people consume and then they don't want anymore.

Ok who else? What do you throw away?

Girl 2: Things that people have already used and then they throw away

Boy 1: the things we put in the trash that can't be recycled

Ok thank you very much anybody else?



Girl 5: the things that people think that cannot be recycled but there are things that can and things that cannot

Exactly, ok, let's move on to question number 3, how do you think that garbage affects the environment?

Girl 4: I think that it affects it by creating pollution

OK thank you very much

Girl 1: I think that the way garbage affects the environment is in decreasing animal populations

Ok so you think that garbage endangers animal populations, (student says yes) Ok, how? Can you give me an example?

Girl 1: um, well we learned of an example earlier that when you bring turtles from a different habitat fishes go down and turtles go up, so we can suffer too

OK, and what role does garbage play in this? How would garbage decrease the population of turtles or fish?

Girl 1: In the way that people are careless when they throw a wrap in the lakes and oceans, and rivers.

Ok thank you, perfect, who else?

Girl 5: Well if you throw things that can be reused that trash that can be used again, then for example trees if you waste paper that can be recycled then trees are becoming extinct

Ok trees could go extinct if we don't recycle or reuse paper, ok anyone else?

Girl 2: that trash can affect trees that produce fruits and there are people who can't afford to buy food from the stores so they won't have any food

Ok, so garbage pollutes affects trees how? In what way does garbage doesn't let trees produce fruit?

Girl 2: by affecting the tree, like pollution

So affecting the trees?

Girl 2: that to make more things, like for consumption they would cut the trees

Ok so because people are constructing buildings there will be less soil to grow things to eat?

Girl 2: yes

Ok thank you very much. How do you think reduce, reuse and recycle can reduce the amount of waste we produce?

Girl 3: Because if we reuse things, we throw out less garbage, so there would be less garbage  
Perfect, thank you very much, anybody else?

Girl 2: that if you use paper and you recycle it you will have less paper in the garbage

OK, can you go further, can you see how that would go into a bigger cycle, not just by recycling you get less paper in the trash, but also there's less need to make more?

Girl 2: ok so less trees would get cut

Exactly no need to cut as much because you already have more paper that is being recycled, you could make paper out of paper and not paper out of trees.

Girl 2: yes

Girl 4: yes and that you can save more trees

Exactly how else do reducing, reusing and recycling, can reduce the amount of trash we produce?

Girl 1: well if you can at home you can reuse cans and lots of things we usually throw out and so the other people like the person who works in your house will start seeing you and they will start maybe doing it and then it evolves and more people do it

Ok perfect anybody else? I am going to move on to question number 5, ok did the garbage project change your mind about the way you dispose, did you see garbage differently before and after the project?

Girl 5: before we did the project I used to think about paper that we waste could affect trees, but now we're affecting things about our environment, now I can see trash in a different way for example I can reduce what I consume and recycling, like telling people.

Girl 3: Like before the project I didn't realize how much garbage we produced in my house, and I didn't realize that a lot of the trash that we produced in my house was recyclable and I've started to recycle.

Ok, now who else?

Girl 1: Honestly kind of, but my family already took advantage of anything that could be reused but the trash that we produced wasn't really reusable or recyclable, so ...

That's good that your family already does that, but did the project make you realize or be more aware of the problem that garbage is in society and for the environment?

Girl 1: yes, of course I noticed that it wasn't only in my home that I had to do that, it made me expand my knowledge, and understand how important it was

OK thank you very much, anyone else?

Girl 3: yes, now I throw out as many things as I did before because now I understand how everything is connected, like how environment, animals, and plants are connected

Ok, thank you very much, anyone else?

Boy 1: Yes, after the project I realized that the most things in my house, the most garbage was recyclable things, and we started to recycle, and less garbage in my house.

OK, thank you very much, anybody else? No? Ok so let's move to question number 6, Did this project cause you to make change the way you and your family deal with waste? Some of you already mention some changes, can you just describe them a little bit more, can you give me some more examples?

Girl 3: Now I try to use less paper, because one of the things that we in our house was paper so I've started to use less paper.

OK, thank you anybody is using or buying less, anything? Something or recycling something

Girl 1: In my house we started using less bottles, and the bottles that we use we recycle.

OK, thank you very much, anybody else?

Girl 5: Well at least me, is not like everyone in my house, I'm reducing the amount of paper that I use

Ok thank you, anybody else is doing something different after the project at home?

Girl 2: I realized that in my house there was a lot of trash, and I told my parents and so now we buy less paper for the month.

Boy 1: We are recycling newspaper and using less paper at home

Ok, guys I see a pattern that all of you, are saying that you're doing something different all of you are reducing the consumption of paper some of you are recycling plastic bottles or bottles in general, do you know the difference between reduce, reuse and recycle? (All students say yes at the same time) Can some of you try to explain what they are?

Girl 1: Reuse is I think when you use something old that you didn't think that need it, or used before and use it for another purpose, and use it again.

Ok, so can you give me an example?

Girl 1: um, ok (sounds dubious) like a cookie jar, it may come with cookies, or you put cookies in it, and you can take it as a pot later.

Ok perfect now what about recycling, what is it exactly, anyone?

Girl 5: for me recycling is like, for example if I have something that I don't want anymore and I would like to throw it away instead I would recycle it and make another thing with it, like making other things with that same thing so you don't have to throw it away.

Ok does anybody have a different opinion about this or something to add to what she said about recycling?

Girl 3: For me recycling is when you, for example cardboard, you take cardboard, and put in a pile and give it to the recycling company so they can reuse it

Ok you all have a little piece of the process, recycling is taking a material and turning it into something new, giving it a second life. Like you said cardboard you make a pile, with all the cardboard and the company or you take it away to the recycling center, and then they take that cardboard and they process it to make more cardboard or things made out of cardboard, same thing with plastic bottles, they processes the material to make new things with made out of plastic, give it a second life.

Now if you could change one thing about the garbage project what would it be and why?

Girl 1: I think that instead of measuring the garbage every day I would put it weekly

Ok I understand why you guys would suggest doing it weekly, but you need to remember that if you're going to collect garbage weekly is going to get stinky and it's going to be difficult for you to look around the garbage when it's really stinky.

Girl 4: yes it would be, and I think that maybe we could have two garbage cans and separate the things you can recycle and reuse and the things you cannot, instead of revising the whole entire garbage bag.

Ok, you know the thing with that is that you are not going to be home to check on it, and then the person who helps around the house is going to have a hard time doing that for you, but that's a good proposition. Anybody else would change something? Ok do you think that this activity was important and you would want to keep it for next year? (All students say yes at the same time)

Ok, thank you very much I am done with my questions unless you have comments or questions you guys can go home because I know it's almost 2:30pm.

Ok, thank you very much, bye!

## Appendix 29

### 8<sup>th</sup> Grade Group 1 Focus Group Transcript

OK, ladies the first question is I would like all of you to tell me your names and the subject that you like most in school.

Girl 1: I like Math

Girl 2: My favorite subject is Math

Ok next please

Girl 3: My favorite subject is Social Studies

Girl 4: I like Math

Girl 5: My favorite subject is Math

Girl 6: My favorite subject is French and I like Science second

Girl 7: I like Math

Ok now let's move on to question number 2. Please explain what you understand for energy consumption, what is that?

Girl 7: I think energy consumption is you consume energy

How do you do think you consume energy, or when do you think you consume energy?

Girl 6: I think that you consume energy when you charge something or maybe when you're watching television, turning on the lights, using a fan, and there are lots of types of energy And you tell me if you're consuming or using any other type of energy than just electric?

Girl 7: all the time we're using kinetic energy

Ok thank you, anybody else?

Girl 4: We use all the time solar energy from the environment, we use the environment to have energy...

Great any other form of energy or way to consume that you can think of?

Girl 4: well there's thermal energy, I don't really know what they use it for, but that's one right?

OK I want you to think about your daily life do you think that you consume a lot of energy? (All 7 seven students say yes at the same time) Ok can you give me a few examples about when in the day are you consuming energy? (students participate indistinctively)

With the computer... the lights when I turn them on, the fan in the room, we left them on so right now they wasting energy... (students agree and laugh)

OK anybody else wants to say something before we move on to the question? Ok how do you think energy production and consumption affect the environment? How do we affect the environment when we consume energy or when we produce energy?

Girl 2: Basically when we are producing or consuming energy, both of them I don't think that we do well, we waste a lot of it, and because the energy that we're getting is not like we're getting it from the air, we're sort of destroying the environment, we need it, but we're constantly wasting it.

Ok, thank you, anybody else?

Girl 6: Eh... energy comes from generators, and when you're building a generator you're probably causing pollution, and to get energy the generators are far away from town so I don't know you need to throw down some trees or something probably? (seems dubious of last part)

Girl 7: I think that using a generator like she says we are creating a lot of pollution because we were taught energy is not created out of nowhere it can only be transformed, so we need to take things from the environment and create an electrical current

Ok, great answer, anybody else? Where do we get energy from the environment? You're right thinking that we get it from the environment, what we fight about? What do we need to produce energy?

Girl 4: Plants?

Ok plants a sin trees, or plants as in production plants, like an industry?

Girl 4: I think plants as in trees in general, and also windmills, and solar energy, water but where do we actually get it right now? ... from generators...

Gaby: How do generators produce it, they just magically produce energy?

(Students answer no at the same time) and start talking indistinctively amongst each other ...

Somebody screams FUEL!!! Then everyone agrees, and says fuel, too.

Ok, magic word, FUEL... And where does fuel come from? (Talking indistinctively: from the ground, fossil fuels) from the ground so what we need is oil, that we need to get from the ground to produce energy that's the main way we get energy. So how do you think that process affects the environment? How do you think burning fuel, because that's what generators do, affects the environment?

Girl 3: I don't know maybe in the process of converting oil into fuel we use chemicals that aren't good for the environment, I don't know

Girl 1: When we take oil from the ground it can spill all over and damage the world, water can get dirty, and the environment too

Girl 5: do you remember that oil spill in Mexico?

Girl 6: That was really bad and it contaminated the ocean really badly, things like that could happen, accidents, and taking the oil from the ground can affect the environment too

Excellent, can you think of a long term effect of burning fuel to the environment, something that's being going because we have been going on for a while, and I am interested to know if you are aware of this, something that is cumulative?

Girl 7: I think that it's been the ozone layer, there's a hole in the ozone layer

OK and how has burning fuel affect the ozone layer, and the atmosphere?

Girl 3: I think that when we burn fuel fumes and things are released into the air

Ok, thank you, let's move on to question number 4 do you think that reducing the energy bill or reducing fuel consumption, at home or at school can be good for the environment?

Girl 2: I think that yes it would have a positive effect on the environment because I think every little thing you do can help, and I think that even if just switch off the light when you leave the room it could somehow affect the consumption

Thank you, anybody else?

Girl 3: I agree with her and let's say that we do those things like turn off the lights and stuff, then other people, more people will want to do that same thing, and people might start taking care of the environment, and turning off the lights too and that helps.

Girl 6: I think mainly we could start to create a greater change, like among our houses, and school, I mean at school what are we like 400 people? We could talk to our parents and our parents talk to other people, and it would go and go, and it would be better...

Ok, so do you think that if we do something that's good for the environment you think that that would make other people do it too? (All students say yes at the same time) Ok do you think that that actually could happen without you saying anything to the other people? (Students say no at the same time) So do you think that you need to talk to the people and tell them what you're doing and why? (students say yes at the same time)

Girl 2: Yes you actually have to give people a reason why, and explain to them how is affecting the environment and what would be the consequences if we don't take care of this problem, and would be the consequence if you do, and that would make people understand

OK, thank you, anybody else? OK so let's move on to question 5, did the energy project that you did in the beginning of the year did that project change your mind about the way you and your family consume energy and fuel? How?

Girl 7: yes, after the project I actually told my parents to change the incandescent lights for fluorescent lights, and I started turning off the lights in the night because I never did, now I do. Ok, did your parents agree to change the incandescent lights for fluorescent ones?

Girl 7: Kind of, they changed three because the other were already fluorescents lights Thank you, anybody else?

Girl 6: Yes, after we built the graph about the estimate price that my team paid for I was really surprised and when I got home I started saying to turn off the lights, and like every time I went out of my room I turn off the lights. The lights in my house are already fluorescent and the bill went down a lot. And there was a light that we used a lot burned, and my father wouldn't change it for months the bill went down too, like \$300 so I was really happy.

That's good, anybody else?

Girl 2: Before I had this crazy theory that even if my phone was completely charged, I charged it more it would get more energy and last longer, I did that with my video games and my laptop, after I found out there's no difference I started unplugging and taking it off the plugs

Ok, thank you, anybody else?

Girl 3: I think that after the project, everyone in school, I mean a lot of people did start turning off things lights and taking more care of the environment, so...

Girl 6: Also my computer always would be connected, and anything in excess is never good so actually leaving your computer connected for one week actually damages it so now my computer only lasts 20 min without a charger...

Girl 7: I would like to add that I used to lock myself up in my room with the AC on the whole day, and now I only turn it on at night, so the bill did go down a lot after I stopped

Oh, that must've been a big change on that bill I bet, parents were really happy

Girl 7: yes they were!

Now on that note, do you feel that you've had to make sacrifices to lower the energy bill or in order to remind yourself to turn off the lights, do you consider these sacrifices?

Girl 4: Kind of, now we are used to them and now is more like a habit is just a matter of habit... (other students say yes)

OK does everybody agree with that (all but one student say yes)

Girl 2: Not really, and I mean for us is like the pleasure of being lazy, if it's a light we don't want to take it off because it's like, 3 feet away and I'm already here, just doing that is not a big deal.

OK how about in terms of living in the DR, I've lived there all of my life and I know it can get hot in the summer, anything from Feb to let's say December is hot, so you know being without an air conditioning is challenge, but I know people that even when is hot will bathe in hot water. (all students laugh and agree at the same time) So that would be a change a break of habit that you would have to do, and some people consider that a sacrifice, have any of you tried to break a habit?

Girl 1: Well in the morning when I take a bath I turn the heater , but when I come back at night I because when is so hot I just want to take a cold shower, it was a sacrifice because I was used to the hot water, but now I feel much fresh with cold water

Girl 6: Well the heater stopped working at my house for a couple of months and at first is annoying to bathe in cold water at 6 in the morning, but I got used to it, but the when it started working again I forgot about it and used hot water again, and now I feel guilty  
You say that you've tried to change your ways, have your parents perceived or noticed your change?

Girl 3: Before the energy audit my dad always told me told off the light, and the fan before you go to school and I never listened because I didn't care much...

Do you think your parents care more about the environment or about the energy bill?

Girl 3: Well I think the energy bill, but after doing the project I started turning off the lights and the fan when I go to school, so my parents did notice

Girl 7: My father used to tell me to turn everything off, and he used to show me the bill and say :this is what YOU do, you are doing this" showing me the bill, and I was like uuh God I'm sorry I didn't mean it until we started doing the energy audit and after that I was checking the bill, not only because we had to do it for the project but I started checking the bills every month and it started to go down and I was really proud of myself.

Girl 6: My father is contracts with the secretaria (ministry) of environment so I think he is worried about both, the bill and the environment, so after we did the energy audit, I started turning lights off, and switching things off, and one day he called me and said "tell your little brother and sister to turn everything off before they leave" and I asked him "why are you telling me?" and he says "because you're the only one who thinks about that in the house"

That's nice, ok anybody else? Ok well last question if you could change one thing about the way we did the energy audit project what would that be and why? What would you change in order to make it better?

Girl 5: I think that it needs to be a little bit more organized because were working in five groups and we had to count lights, and I think we need more people, like more classrooms, I think it will turn out better if 9<sup>th</sup> grade worked with 10<sup>th</sup> grade, and like we needed more time

Girl 2: Is not like more class time, is that this time it was new to us and we weren't introduced to the topic before, and we didn't really know the information that we needed to collect when doing the audit

Ok so you needed more clarity

Girl 6: We counted and then we had to wait a week to work on the project again so

I think it would have been better to do it constantly I think in one stop.

Do you think that it would be good to include your parents at any point, to maybe communicate to them what you were doing?

Girl 7: I think that when 8<sup>th</sup> grade does this next year they should include more people and not only their parents, like every grade should do something about it, both the environment and the energy issues

Ok so you think we need to make all the classrooms aware that they have to save energy

Girl 7: Yes so that everybody in the school would be aware of what's going on, maybe like a school campaign

Alrighty thank you very much, that is all unless you have questions or suggestions. That is all from me. Thank you guys!

## Appendix 30

### Staff Interview Transcript

Hi everybody! Ok let's, make this very quick because I know everybody is busy and I have a class at 10:00 am. I wanted to thank you very, very much because you've all made this possible and I am more than pleased with all the results we've been getting.

Staff1: We are extremely happy too!

Ok, so let me begin with the first question. What is your overall impression or perception of all the activities from 5<sup>th</sup> through 8<sup>th</sup>? Just from what you've seen, and heard or witnessed, what is your opinion about the activities?

Staff 1: First of all the garbage sorting one, the composting activity, has given them their very own project, they make the choices, and they feel empowered, and the garden project has been inspiring for everybody. It was taken over to Aldeas and how it's been turned into a community service it is just fabulous. They really feel that they are making something special, I bought vegetables from them, and I think is really cool for them and they're keeping it up.

The difficulties are definitely, that you need someone to be on top of it and next year we are going to have Yvette move in to work with that project, because Gaby can't do it all and still do her job of overseeing teachers. Teachers often forget, they're on to the next project, or thing, and the projects can get out of their vision so I think that having somebody as "encargada" (in charge) will make it really happen.

Staff 2: Well I think these are great awareness and eye opening activities for everybody and the kids feel like they know so much now, and the parents are extremely happy.

Staff 1: Yes, and the fact is real life, and the activities are hands on is very motivating for them.

Staff3 : I would say that one of the things that I really like about it is that they're still in it, they feel like they own the projects . The ownership part has been really powerful to them.

Staff 2: One girl went home and told her mom that worked in St George that they should do this project at their school, so they're advertising it.

Oh, that is so great! Ok, now I know that the 7<sup>th</sup> grade one have they started?

Staff 3: Yes, they started but they've only done one class.

Ok. What about the 8<sup>th</sup> grade one, have you talked to Dennis about what he has done, and how it's been, because I know he did it in the beginning of the school year.

Staff 1: I haven't heard much about that one be really honest.

Staff 2: I know in the beginning of the year I saw them walking around and asking for materials but not much either

Staff 3: Yeah 8<sup>th</sup> grade one is the one that's been the most kept "inside", Lynn heard about it because they needed the bills and the electricity stuff and they did some of the calculations and the graphs.

Staff 1: They did send me the graph and it was eye opening and that if we were to add air conditioning that would cost a lot of money.

Yes, I saw the graphs and I saw the work, and I talked to Dennis, and he did really explain, he was very thorough and he did a lot of work with the students and when I talked to the students you could really tell how much they had done, and the impression that the activity had on them. I am aware that they did a good job, and I understand that he did it in the beginning of the year, so by now it might have started to fade off a little bit.



Staff 1: I would say that it needs to carry on... I don't know.... Hmm, because they suggested that we installed sensors for some of the lights, but ...

Staff 3: Maybe include something that they can do after

Staff 1: Yes, that would be a good idea

Ok, so that is something that I'll keep in mind. Were any of you more involved in one particular activity than the others? I know Gaby has been all over the place!

Staff 1: Personally, I was more involved in the Garden activity, I went with them to Aldeas to see it and here, and because I've been buying the vegetables and the composting one because we all have to look at our garbage now and put it in the right place. Those are the two have impacted me most personally on a day to day basis.

Staff 2: Well I haven't been too much involved but I did substituted in both 4<sup>th</sup> grades and its amazing to see how the students have taken over, and they know their jobs and they know what to do, and they know how to do them, and I think that is the same as 5<sup>th</sup> and 6<sup>th</sup>, nobody has to tell them anything.

Staff 1: No, they definitely come in and collect the garbage, and they do it on a very regular basis, they're really into it.

Staff 3: Yeah I think that when speaking to the kids it definitely comes out that they really are involved in the day to day happening of the projects happening with the projects, so they (the projects) are really theirs and we see that...

(Both other staff members agree saying a loud yes)

Staff1: And like I said, we usually have to be on top of them to do that sort of thing so, they are perfect.

Ok, besides the fact that you (Staff 1) mentioned that definitely you need a person on top of supervising the projects especially the compost and garden one, what do you think were the biggest challenges for the activities, besides needing that extra person to coordinate the logistics of the whole thing?

Staff3: Maybe time, need more time, with the different classes

Staff 1: Yes, I would agree, the taking kids out of practice time, or class time, that sort of thing... because you have to make sure that the teachers are on board, we would definitely have to make it part of the curriculum so it doesn't seem like it's something extra that they have to do but part of what they're doing integrating it to the curriculum as much as possible, which is what we've always wanted to do anyway! But if you don't have that integration then I think that the teachers might see it as a bother.

Staff 2: Yes, and we need teacher integration to make sure that it continues

Staff 3: I would definitely agree with that, the integration into the curriculum although it was done... let's say... the idea was there, the connection was there, the real curriculum integration of the day to day happening of your themes and the day to day happening of the projects need to be a little bit more cohesive, and the teacher involvement there is key because at the same time that you need a person there leading it, the moment you have a person outside the classroom leading it, the teachers are like in an "in between" way, they're not really the ones pushing the projects, they don't feel like they can make the decisions, and yet they can, so that part, and maybe... the money... the money issue... (All other staff members agree saying an audible yes and nodding their heads)... it costs a bit, although they're meant to be sustainable in the long run, the initial cost is there and we did a fundraiser and yet, we used the money more for the Aldeas project than for ours, so the money issue is something to think about.

Ok, yes definitely, I hear you... It can be hard...

Staff 3: It's worth it, is just something to think about

Staff 1: Well yes, is just that initial part of the projects that you have to have, to make it work

Staff 3: Maybe integrate a fundraiser into each project

Staff 1: yes and maybe have a bake sale, or do whatever you have to do to keep it going and become sustainable.

Ok, now how did you from your staff position how did you help the teachers approach or manage some of the challenges? Did the teachers approached you with questions or concerns, and how did you manage to handle that, or maybe unwillingness to participate from par of the teachers?

Staff 3: Not really, the teachers were willing to make the time for it, maybe there were a couple of times when we had to reschedule things, but not really any complaints... there were some minor things, like "oh the kids really want to do this today, but please tell them that not every day we can do this", and stuff like that, minor little details not really anything big.

Staff 2: And I think that teachers were really enthusiastic about it and were helpful and supportive because there was somebody in charge, they didn't have to take it on themselves as another responsibility, and so definitely, having somebody in charge is really important.

Ok, thank you. Now can you explain how important you consider these activities to be in terms of helping the students to become more environmentally aware and to act in a more sustainable manner?

Staff 1: They're definitely important, I mean having the kids tell their parents that they have to recycle, and they are well aware that there are different energy sources, they been talking about that and coming to my office to discuss the possibilities and they are really serious, and they're coming up with ideas, so I think that they have definitely taken this on as something really important

Staff 3: I think that it has definitely created a culture here in school, a culture of thinking about these things, and also just the process, just putting the trash, putting the compost in one place, and the recycling in another... even the preschool kids are really involved in the project, and they've created habits in the kids (all other staff members nod and say "yes") and the whole culture of the school has changed, its impacted us in a very positive way, the whole community.

Staff 1: And actually the other day they were reminding the students about the garbage cans and one of the students came up and said "actually we should make pictures so we don't have more problems like these"... So I think it is making a difference that the level of response from students has been good...

Ok, do you think that the students would replicate these activities at home?

All talk at the same time: "some of them are"... "yes, definitely"... "yes I think so"

Staff 3: Some parents are coming to school to find out about what organic pesticide we're using because they're doing some organic gardening at home? So kids really took that home...

Good ok! Do you think that there could be one activity easier to replicate at home more than another?

Staff 2: I would say the recycling one (garbage project) is the easiest, because separating paper, and plastic, and other stuff is easy for them

Staff3: Well I know some people that have started the composting already, I myself did and it's pretty easy to do, not many people have started it, but the ones that have, have told me that it's very easy to do, all you have to is basically put it in a jar and I live in a very small apartment, so that is really simple, the only thing is, that only the people that have done it have realized it.

Staff 1: What might be a good idea is like, since you have your own little composting jar if you take several pictures of it, like when you start, and labeling first step, etc. with the time that it took to make the compost and how it progresses... I am scared to try it myself because that sounds difficult, it just sounds complicated to me, and the things that I see online are this very special (makes signs with her arms suggesting large composting units) composting things, and I just won't be using that myself, but a jar? I could do a jar...

Staff 2: Well my idea was you have to have a yard to make it...

Staff 1: Yes, people have misconceptions about it...

Staff 2: And if you don't have yard, then you can't do that, that's what I thought, and that's why we were doing it at school

Staff 3: Is one of those things... Since, the way we do it in school is in the yard, in the bin, taking it and transferring it to do it at home, the kids are just taking what they see to home...

Ok, so you think that maybe we could develop some sort of information packet for parents with examples on how to...

Staff 1: Yes, that could be something that the kids next year could make part of the project, make a brochure on how to make your own compost at home, and they could put together a real nice project from it.

Staff 2: That would be cool

Ok, yes, and that would be a way to keep it going outside of the school, and keep the kids motivated and also have the parents to be more involved in the activities as well.

Staff 3: I was going to say that in the Aldeas the direction is very excited about doing composting, not only about the garden, it started out as having a garden but they really want to do the compost too

Staff 1: Yeah, I guess is getting over the fear factor, the reason why people would easily separate garbage is because is easy, but the composting sounds more scary, so if we can lower that and make it seem more doable to them, then they'll probably be on board...

Staff 2: And another thing too about the influence to the program of the cafeteria, now they use plates, and plastic (reusable) baskets, washable things instead of Styrofoam, is much better. They have garbage cans labeled outside so when you finish with your plate or basket you know where they go to be washed! (They show the basket to the camera)

Yei!! That is so great!!! That is awesome!!

Staff 2: These have been like the perfect projects for our school though, hippie school, hippie projects! (they all laugh together)

I think that we could really make an example of the school, because I don't think there is any other school in the DR that is as advanced as you are in implementing, or even at the conception level of having ideas, I think that you guys are way ahead of everybody else in environmental science, so I am so psyched, I am so happy!

So you mentioned that some of the activities motivated you to try to replicate them at home, maybe some recycling that we at some point always do some recycling (Speaking to staff1), and you (staff 3) already said that you have started to compost, is there any other thing that you've tried?

Staff 3: Well, not really, I mean I've been separating the paper and plastic and all that

Staff 2: I changed the light bulbs in my house, which is a big move for me, and I brought in cardboard boxes today!

Ok! But this was all out of motivation because you've seen the activities are working out?

Staff1: In our house we started recycling, we have different areas for the different things, and then my next step is composting, if Gaby teaches me how to do that, and honestly I've been wanting to for months and I feel like I don't have time, and I put it off... you know?

Staff 2: But I like that idea of making the brochure because then the kids would really understand it, and they could even make their own, and then their parents would learn how to do it too.

OK, so what is your perception of the level of participation and support that the parents have provided to the activities.

Staff 2: I think that the parents were very supportive, especially when you went to Aldeas

Staff 1: Yes and with the garden they tried to bring supplies, and you got a lot of stuff

Staff3: Yes I got a lot of stuff, they brought bags of soil, and they came and help with the initial planting

Staff1: And now we have parents bringing in recyclable paper and things like that so, yeah I think that they have been supportive

Staff 3: And even though there hasn't been a specific effort to make them involved besides the letter sent at the beginning of the year, so I think that the fact that they've been helping is better than we had expected in the beginning.

Staff2: And another thing, prospective new parents when they come in and they see this, they are quite impressed with it

Do you have any suggestions for next year, just to try to keep them going, to improve them? Besides all that you've mentioned before?

Staff2: I think that we should start it off the first day!

Staff1: Yes we should do it at the very beginning of the year, right away

Staff2: Yes, now that we know what's going on we could have it ready before hand.

Staff3: I would say that the integration of the activities to the curriculum, have it thought out since the beginning too and maybe do a session with the teachers in training in August

Staff2: Talking about this and explaining to them what their role in August would be a really good idea

Staff1: We need to make sure to produce in them a lot of enthusiasm, and also we're talking about integrating it to the curriculum as plans I suppose, but we also have to look at it as all those other skills that we teach, organization, and planning, and the average day to day taking routine. A lot of kids here don't have experience with dealing the responsibility, and that teachers need to realize that these are as important that they learn as all other things, environmentally, scientifically, but also personal responsibility to the Earth, all that. I think that in the society that our kids live in, where everything is done for them, this would be particularly helpful.

Staff2: And they are excited about, the 3<sup>rd</sup> graders are excited because they're going to do the recycling. The 4<sup>th</sup> grade is because the next year they're going to do the composting, and it carries on, and it gives them something to look forward to.

OK, this is my last question overall you do think that the activities should be continued in the next year, and in years to come?

Staff1: Yes, absolutely, and we will continue them with or without you! (All laugh)

Staff 2: Yes, they need to continue

Yes! Would you be willing to be adding any extra activities to any other grade? I know that 4<sup>th</sup> grade has already been doing the recycling which is awesome, but would you be willing to get the teachers thinking about how they could come up with one activity that relates to the environment in each of their grade levels and maybe just connecting it?

Staff2: I think so! And then the next year the kids will know that they'll go to the next step! Yes!

Staff3: Actually the project already inspired a little construction project in the back of the science room, which is the outdoor classroom, and we're setting up an area to probably in the future, keep animals and plants so that kids can do a little measuring, so that we could get many other projects started, it will help us with the hands on thing from elementary to high school. Thank you so much for everything! It's been great having your support!

## Appendix 31

### 5<sup>th</sup> Grade Teacher Interview Transcript

The first question that I wanted to ask is how well do you think the composting activity connected to the Rocks and Minerals theme? Was it very hard to connect?

Teach1: Ok, I think it connected a little, just a little in the fact that they (students) know that when we talked about the soil, the soil has minerals and that these minerals are necessary for plants, and that those minerals go to the animals through what they eat, and that way it connected to the theme, but other than that not much more.

Teach2: No

Ok, you feel the same way (Speaking to teach2)?

Teach2: (Nods)

Ok, how do you think we could fix this for next year? How would you think that we could make it more cohesive? Or do you think it would connect better to another theme, or in another class? Do you have any suggestions?

Teach1: I think that we need to have an independent theme for it, for composting

Teach2: I do to, I think that it would have to be another theme, I wouldn't know ... I know that 6<sup>th</sup> grade did a garden or something?

Teach1: I think that for you to be able to connect the composting project to theme you would need a theme where composting perfectly fits in... I don't know... Maybe... I really don't know what theme it could be, but we definitely need an independent theme because the ones we have now...

Teach2: It doesn't really goes with anything we have now

Teach1: I don't know maybe... I don't know, do like a green kind of theme (Teach2 is nodding at the same time) where we talk about planting, gardening... Maybe

Teach2: An Earthy kind of theme

Teach1: Talk about the greenhouse effect, things that are happening to Earth, make a them called "our Earth", I don't know... Talk about how to prevent our Earth from going in the direction that is going, which is totally destroying itself, we are destroying it

Teach2: and discuss pollution (Teach1 says an audible yes)

Teach1: ...and then having a project of composting that they could work on it throughout the year, and then maybe have at the end of that green theme and then see the relation of what they've been doing throughout the year on how it can help our world

Teach2: Maybe with recycling and all that being tied up together

Teach1: Exactly

Ok, let me see if I understand, when you're teaching the rocks and minerals theme, do you guys approach, or tackle or discuss soil at any point?

Teach1: Briefly... (teach2 nods) we talk about the soil, we talk about erosion, we talk about weathering, we talk about the minerals, how these minerals go into plants, that animals later on eat, and fossils and sedimentation, but briefly, we do not talk about the soil and how rich it is, and how important it is

Teach2: or the levels of the soil, the top soil, etc.

Teach2: Exactly, because we have 6 weeks for a theme of rocks and minerals, and all the things we have to cover for rocks and minerals is very broad, and composting I think is very broad itself so I think composting should be its own theme.

Ok, thank you very much, I wanted to ask you... Because it seemed while I was listening to you answering the questions, how involved were you, how empowered were you to teach this unit, or to help out with Gaby, how prepared were? How much of an opportunity you had to participate with the students in the composting activity?

Teach2: When you consider the many things that you do in one day, and all that we supposedly cover (teacher makes quotation mark signs with her hands when says the word cover), I would say not very well prepared at all, because in general, teaching rocks and minerals, that's something that I am learning so I can teach my kids the theme (makes quotation mark signs with her hands when says the word theme) and I was supposed to cover Rocks and Minerals but not composting..

Teach1: No, we were told since the beginning of the year that the composting project was going to be something that we were going to connect, like referred it to the kids but it wasn't going to be something aside from theme, and it was something that Gaby was going to be in charge of and everything was for us to be open to the composting project for us to be sure that the kids had time to go do composting , to allow them to be in there collecting their garbage things for the composting project, and I think there was this one time when they had this project, they all went outside to do the posters, to get the trashcans together, to label them were we collaborated with Gaby at some point, you know, keeping the kids were doing what they were supposed to be doing, but aside from that we were not involved in the composting project right now, more than that...

Ok, thank you so much, there's this idea of continuation for next year, this was more like a pilot project that we wanted to try out, I was actually surprised of all that the students were able to achieve, and this is the only school were these activities have been implemented...

Teach1: and they've achieved so much because is a hands-on kind of thing and it required movement and the rotation, the chart that they had, that this week "such and such" are in charge of composting and next week is going to be "such and such" and rotating between classrooms and going to take care of the composting thing, it made them move around and it was such a hands-on project and actually visualizing it, it was so tangible that that's why they enjoyed it, it was different than what they're used to doing in the classroom that it came out to be something productive for them.

Ok, I wanted to ask you would you be willing to continue this and integrated, like you said make it a theme?

Teach1: If it's made into a theme, yes, if it's something plus, besides the other things that we have, no

Ok, from your point of view what do you think were the biggest challenges for the composting activity?

Teach2: the concept that everybody had to be involved, had to participate, I have in general, kids that aren't natural leaders and it was kind of hard for them to take the initiative to do something without playing and running around, it's tough for them to be on top of the rotation, or in charge of picking up garbage in different places, there were just some kids that you wouldn't put in charge, or you wouldn't allow them to do it, because is not in your best interest, so that was a challenge.

Teach1: I think that logistics wise it went pretty well, Gaby did an awesome job at keeping the chart and the numbers and rotating them, keeping the numbers of the couples that were in charge every week, the kids knew when they had to do their composting project, logistics wise I think it went pretty well because Gaby was on top of it. Still I think there are some kids, like she (teach2)

said that since they don't have much of an initiative, or maybe they require more guidance or more information about it to be able to be more involved, then making it into a theme would be more logic thing to do.

Ok, so basically you were helping Gaby out with whatever she needed ...

Teach1: Yeah, providing her with more time within class hours, she had a couple of group activities with them, and she had the labeling process with both classes together, the kids stepped out of the classroom several times a week to do the composting project part, so basically the only thing we did was to cooperate with her and be open to the composting project.

Ok, thank you. How important do you consider the composting activity to be in terms of helping the students to achieve a better understanding of composting and to develop a more sustainable conduct, or to have a more environmentally aware conscious? Have seen a change perhaps?

Teach1: I think it's been important, but I think that everything is going to back to the fact that is not a theme and it's not given as much time as it should have. I think it's made a difference on the fact that they know now what composting is, and maybe when we started they had no clue what it was, I'm not that it has started a culture per se of composting, or that it has become a part of them...

Teach2: only those who are really conscious and aware of it

Teach1: I think is very important because now they're knowledgeable of the topic, now they know, they have some kind of awareness you could say, but to give it more importance and for them to be more aware and to become proactive about it and do something with this composting knowledge that they have they need further more information.

Ok, Do you think that the students will replicate or will try to compost outside the school environment, do you think that they are motivated enough to go outside and think about replicating it?

Teach1: I don't know, it's a group activity in school, is a team effort, maybe you guys could try to motivate them before the school year ends, to take it outside or maybe to do it at home for those who have gardens and see... I cannot tell you if they're actually driven to do it outside of the school I think they would need that team effort, that guidance and that person, like Gaby with them... I don't think they would do it on their own, just that handful of kids that actually saw the need of composting on their own.

Ok, Did the activity motivate you to try to compost, to try to compost at home?

Teach1: No (teach2 shakes her head)

Why do you think you don't want to compost?

Teach1: I don't have garden, I live in an apartment, I have three kids I have two jobs...

Teach2: Me too I live in an apartment, I'm not even close to grass

Teach1: How we contributed was every time we went to the kitchen, that I sometimes have lunch or breakfast here, the banana peel went into the composting trash, we made sure to tell the ladies at the kitchen whenever you make coffee put the spare of the coffee here in this trashcan, or whenever we peeled an egg we put the eggshell there, or an apple that went bad, we put it in the composting garbage, and that's as much as we contributed to the composting project not more than that.

OK, let's say if you had more time, and that you were given let's say more knowledge or more information about composting, would you consider it important enough to do?

Teach1: Well if I had more time to actually apply it and see how productive it was, to see the outcome of it, I think why not?, if it's actually a good thing and it's something that works, why not?



You would be surprised of how easy composting is, my mother lives in an apartment and she doesn't really have garden and she does composting, she does have plants you know for decoration like everybody else, and you can actually use compost to put in those plants and that would make them look and grow even better.

Teach1: Well then that is a misconception that I had, because what I've been shown in the videos that the kids have seen, and most of the kids live in apartments, everything that we saw was outside in a big yard, with a big bin turning compost, and adding things to the compost, so if we could actually see that there is more to compost than just doing it in the yard or that you don't need a garden to do it, maybe then composting would be something that they would apply outside of the school. We should tell Gaby that because I don't the kids are aware that they could do composting at home.

Yes we were discussing that, when we were having the discussions with the kids that was something that came up, as an impediment, you know we cannot compost at home because we live in an apartment and we were brainstorming to see how we could improve, that maybe we should let the kids and teachers know how to compost in an apartment and what to use the compost for. The whole idea was to make the composting project a continuous thing with the 6<sup>th</sup> grade garden, it was to have compost, you know, organic fertilizer to put into the garden for 6<sup>th</sup> grade, so that's why they did it in such a large scale, I can totally see where that went wrong, where we did not give you the teachers, or the kids either ways on how to think broadly and show you how it could be done at home, so that was something that we were talking about. Something that came up as I was talking with the 6<sup>th</sup> grade teachers is that they felt that if the activity was going to go on next year that they would want some training before school start is that something that you would like? Would you like an expert to come and talk to you about and give you ideas, if this activity is to continue for next year?

Teach1: I would like if it's going to continue for next year number 1, for it to be a theme and number 2, I want it to be planned out, the whole six weeks, I want a person to come and sit with me and plan the six weeks of composting and how after that theme is done how are we going to continue with composting throughout the next following weeks because is something that is going to keep on happening, and for us not to be making up activities at the top of our heads, and to be for school purposes also because it has to teach them some academics, and it has to have center activities and all that so that we don't have our heads cut off.

Do you consider composting a helpful practice for the environment and why?

Teach1: yes, because instead of buying inorganic fertilizer why not just make it yourself and you're recycling and its less trash

Ok

Teach2: I mean, naturally anything that is reusing or recycling is a good practice, is not the same to say that is going to become a common practice but I would have to be crazy not to say is a healthy practice for the environment.

What is your perception of the interest and support that the parents provided to the activity?

Teach2: No support at all, they weren't involved if they would've asked to be involved they would've come, they would've taken over, if you plan it in a way to make parents participate I am sure they will.

Ok perfect have you had any experience with a parent saying oh, no, I really prefer my kids not dealing with garbage or anything like that?

Teach2: It's been the opposite, I had to moms telling me how neat the composting thing was, we have parents this year that are very involved.

Is there anything that you think could be included, excluded in the lesson plan in order to make it more interesting, any ideas of your own.

Teach1: Make it a theme!

Ok, do you think that this activity should be continued in the future at school

Teach1: yes

Teach2: If it's made into a theme, yes it would do really well!

Ok, thank you so much for your hard work and time!

## Appendix 32

### 6<sup>th</sup> Grade Teacher Interview Transcript

\*\*\*The video file was corrupted and some of the conversation was lost\*\*\*

You said that you didn't consider the Aldeas population of children poor, why is that? Can you explain a little bit more about it?

Teach1: Well, they have access to healthcare, to education, they have a proper home, they have someone to take care of them, they have sanitation, they're not really poor, they are a community and they take care of each other, and they give each other everything they need, and the organization gives them what they need, through the donations that they get and everything, so I wouldn't call them poor.

Teach2: That was the main focus before doing the activity with the kids, and they came up with the phrase "Community to Community", we told our kids, look, this is a unique community just like ours, but on a different stage, and we're just here to share with them and they will share with us, so that was the idea, that's how we perceived it, and that is how our kids got it.

Teach3: A lot of the kids in the Aldeas have been through traumatic situations that we don't really know that much about, but we know that in order for them to be there in the first place they have to have come from an in-risk family when they cannot be taken care of at home. Many of them probably have many violent pasts that we don't because we haven't really continued to develop a relationship with them, in order to know their stories.

Teach1: If we're able to make the kids make a connections with the kids in the Aldeas they could learn a lot about poverty, and not only that, we talk about standards of living in the unit, and we talk about different income levels, and the Aldeas connects to that also. Even though I personally wouldn't consider them poor, they live under very different standards of living then the kids in the school, they have so much (kids in the TCFL) and the other don't they have share many things.

Thank you so much for your comments they are very enriching, I had my concerns in the beginning about going to Aldeas Infantiles in the first place, because I've been there a couple of times, doing different activities with a different school and I also understood that they did not display the true characteristics of a poor population, with people in need, because they did have their basics needs covered, yes there are people who are in worse condition but I think that for the purposes of sharing the knowledge, sharing the garden, and helping them build a community it would be good to start there because they are already structured. It would be easier for the school student's to share the experience because they're organized. It would be hard to let's say a particular barrio and lets teach this people how to make a garden because it would be a little bit tough to get inside a barrio, unless it would be through a "junta de vecinos"(neighborhood association) or something like that. I thought that for the purposes of sharing for the first time, AI could be good, and it's like you mention through the testimony of the kids in Aldeas, and sharing often, kids could be in touch with that reality, they could learn about poverty without necessarily being exposed to it for the first time in the way that I would want it to, but maybe for the future it would be something to think about for the future: Is AI the perception of poverty that we want to teach our students about?

Teach2: I think that the whole plan of the poverty unit is to explore our own place of living as well, that poverty is not something separate from us, but part of our reality as well, because we

feel impoverished as well in what we consume, so I think we wouldn't be saying we're connecting it to poverty by going to Aldeas I think that is more like to share the garden and so I don't know if the Aldeas would be under the heading of poverty...

Can you identify some challenges for the garden, problems that you encountered?

Teach1: the daily work, keeping it, needs to be more organized

Teach2: First of all chronologically, I think it would be good to have a little meeting with the teachers that are going to be working on it to be very clear.

Teach1: I think we need training

Teach2: Yeah, exactly

Teach1: I think we need to be able to teach the kids, because this year we try to have them figure out, what they wanted to plant and all that, I don't think that we should do that anymore, I think that we should teach them which are the best crops in this area or

Teach2: Or if we do it like that, at least we should know how to filter it, instead of just having to look it up, we study everything thoroughly on the topic that we are going to give them, and in the case of the garden we at least didn't feel ownership. So it was kind of like, "ok, well you suggest this and this crop", which I think it was cool to a point but then we had to do some research and ask other experts, instead of having that beforehand and not wasting a lot of time. After that, when we started the garden we had very specific instructions on how to start out the garden, what we were going to do, and it went pretty smoothly, aside from having to take time out and give it to the garden which was a bit difficult because of the curriculum, but we were able to do it and it was smooth and everything was great. However, after the first crop, after the first time we got tomatoes and everything, the up keeping I would say was the hard part, classes started to get a lot heavier in the sense of more projects they had to do, and we were pushing them farther because it was after the first trimester, we had less time for that, but we also had less awareness of how to be on top of that, to keep-up with the garden, and there were some things that presented themselves that we either didn't remember, or were not aware that they could happen in the garden, so again we would go back to training.

Teach1: Well training of the teachers and the knowledge that the students need to learn beforehand so they can actually take care of the garden successfully, and that would be a challenge because in order to plan this successfully the teacher would need to be an expert, like you have to have grown stuff, you have to have experience with different things, different methods of doing things and know what works and what doesn't, and also the sustainability of the garden, a lot has been invested in the garden, we've spent so much money and we haven't really gotten many things out of it, it was nowhere near anything that we could've sold and get a fraction of what's needed to keep the garden going, so keeping it sustainable would be a really big challenge.

Teach2: Also, for example, even though everybody is very respectful here in the school, there were large chunks of time of the day that since we weren't working on it, other people had access to it and they would try to help and it would be the total opposite, and I would say a lot more control over the garden area while nobody is working on them... And we learned after it happened that if you put the nutrients on the leaves the leaves would get burned, so there we lost a couple of plants because of somebody's good intention to help...

OK, I understand perfectly, one thing about the make it sustainable part is that this year was not going to be year that we were going to get revenue out of it

Teach1: yeah we figured that

Teach2: It's the pilot year

Teach1: but I think that it will be a big challenge for the next couple of years.

It is actually, especially cause we're trying to do everything organic and organic is expensive, the idea for next year is to keep the composting in 5<sup>th</sup> grade running so that we don't have to buy organic fertilizer so that we can just use our compost or at least supplement the organic fertilizer with our compost.

I want to ask you because I understand that experts were brought in to talk to the students and I don't know if you were there, about the crops and how to maintain them, or which to plant first of, do you think that you would require more visitations from the experts ?

Teach2: in that case we go back to the fact that we didn't know, we were learning, and the group were divided into 3 for 3 different experts, but we need to find a way or at least have a couple of experts that we would be working with each year and to have it a lot more organized. They were able to help, I wouldn't say it was something super solid, we got one expert that recommended one thing, but then another expert from another country came and he said "no, no, no you can't do that at all", so that also kind of threw us...

Teach1: The first expert gave all this information and then the kids didn't have anything to go back to, they would come and talk to them and whatever they got from them, whatever they remembered that was pretty much it, because there was no control over what's specifically they needed to learn...

Teach2: And also they would bring their own people, a helper or something and they would do the hard labor, hard labor in the sense of shoveling, instead of having the kids do it... I mean when we were there, we also had to go around and check all the facilities, we tried to be hands on with the activities with the kids, getting our hands dirty, but it was really hard to keep track because there were 6 areas, and then they reduced it to four, and then some of the kids got confused, and having more kids per area and some of them ended up doing nothing...

Ok so definitely logistics issues all the way.

Teach2: But we have learned a lot from the positives and the negatives, we think it's an awesome idea and we have enjoyed it and we have learned a lot. We've also used it to build attachment with our kids, to get to know them, to get to know ourselves as teachers with our kids, we just need to smooth out the details and have everything really organized, and very clear about what will be done

Teach1: I think that the main is that teachers should get some kind of training

I totally agree with you, the garden was actually a very ambitious project, and because of me being here, and the community for learning being the creative school that it is we thought that we could undertake so much more than we had the capacity to do. The hydroponics we couldn't really see the results of it really and I know that the school invested a lot of money in the equipment in something that could potentially render revenue and you could use it as a teaching tool, but this year, it just wasn't the year, I think it just made it more confusing, and is something to take into consideration, is hydroponics something that we really want to continue doing, is it worth it? All this feedback that you're giving me is great!

How important do you consider the garden to be in respect to helping the students achieve a better understanding of the environment? Do you think that the students understood the positive environmental aspects of having a garden?

Teach1: I don't think they understood that at all, but I think they need to understand it and I also think that a lot younger than 6<sup>th</sup> grade they should have more information on this, I mean this is how we grow food, everybody should know how to plant how to take care of crops how to produce their own food, and also learning the environmental aspect f, you know pros and cons of

growing your own food vs getting it at the super market! And that also ties to the poverty unit, we buy foods from supermarkets that we buy super cheap and we're just contributing to a whole system where a lot of people are being sunk into poverty and forced into working in fields to make this stuff cheaper. We could also do it ourselves, we could not be ingesting all the toxins that we do, we could stop polluting...

Teach2: and actually the recycling movement in school started through the garden, so that was really good, and I feel that compared to their grade level and level of maturity they, and also, their immersion into the project, I would've expected a lot more awareness regarding the connection between the garden and the environment, but what they did I feel that they got, was the community aspect of it, the working as a group.

Teach1: I think that there is an incredible potential to raise a lot of environmental awareness on the kids, but I think they have to be connected since they're very little, I think that from pre-k or from kinder they should be connected to the garden, everybody should be a part of the garden in some way, so they are building on that awareness every year, something as simple as having a community garden can have such a big impact on the environment.

Teach2: It also developed a sense of ownership because we had a big soccer tournament and some kids were playing around one of the areas, where we had corn and yucca planted, and our kids were like, "they can't play there because the plants are there!", so up to a point there was a small level of recognition of ownership but not environmental awareness, but that is like he (Teach1) said, it should be reinforced from pre-K to 12 grade, we should have the whole school in that

Definitely, I agree with you both, it did come out when I was having the focus groups with the students that they could not see the big picture, they could not relate to the positive environmental factors of having a school garden they could not think that far ahead. Now talking to you it makes me wonder since this is the first year and that you would have appreciated some training, there's reciprocity in there, if you would've been better prepared then we would've have better results, it's a cycle, so it's kind of my fault, that you were not better prepared, and that this is the results that we are getting, but they have learned a lot, you have learned a lot, and this is a learning process, so if you keep it up in future years this could be the best project of this kind in the Dominican Republic ever! It could be huge! (Both teachers say yes together)

Teach2: They also have been talking to other kids in other schools and they were bragging about the garden and I mentioned it to one of my friends that lives in NY, and she was impressed, she said "wow that is a great initiative" is a great project we just need to really take advantage of it.

Teach1: I think (the garden) could be a short theme unit for each grade and they could spread it out chronologically, from the beginning the smaller kids, or depending on the different things that need to be done, and how they want to apply it, I think that it could be done, not only how to do it, but also, how to keep it up.

Did this activity motivate you to try and maybe you plant something at home?

Teach1 & Teach2: Yeas, definitely!

Teach1: I have kids that started their own garden which is pretty cool

Do you consider having a home or a school a good way to care for the environment?

Teach1 & Teach2: Yes, absolutely!

Yes after hearing you talk about it, it came across, you've also said yes that you consider a home or school garden a useful way to help fight poverty

Teach2 and 1: Yes! A 100%

What is your perception of interest, how participative were parents with the activity.

Teach2: I got a lot of parents mentioning on the communication notebooks, and during dismissal, that the kids were very excited and some had started to gather materials to grow at home, and some participated when we needed to plant and bringing pots and stuff, or suggested techniques, when we got the first crop they were the first to buy, none of the teachers got to buy any of the first batch of spinach because all the parents got them

Teach1: Yeah, I think we got lot from support from the parents! And the better the project the more involved they would be, and even from parents from other grades.

Did you have any complaints or concerns from parents?

Teach1: None at all

Alright thank you! Is there anything else that you think we should include or take into consideration for next year besides the other stuff that you've mentioned before?

Teach2: Planning and time

Teach1: Yeah planning needs to be meticulously done, in stages, and I think that it could be a class, something that we could teach once a week and then go apply it in the garden, and then next week another lesson, etc.

OK, so overall do you think this activity should be continued in the future?

Definitely! (Both teachers)

Thank you so much for your time! See you!

## Appendix 33

### 7<sup>th</sup> Grade Teacher Interview Transcript

How well do you think that the garbage project connected with the Population Dynamics theme?

Teach: Well when I read the garbage project I actually planned around it so that so the approach I used for Population Dynamics was actually trash, at the beginning we started to brainstorm about what evidence do we have in our everyday life that we're overpopulated? And they started talking about traffic, buildings... this, this, and that until they got to trash, and then we went from there... We studied a little bit about Playa Mosquera (Beach of the Flies) and they saw aerial images of Playa Mosquera I actually planned taking them to Playa Mosquera, but the parents didn't want me to take them, so we couldn't...

Ok, so what do you think were the biggest challenges for the garbage project?

Teach: I feel a lot of them as I was speaking to them, didn't actually do it, they might have done it for one or two days, and then invented the facts for the rest of the days, is just a feeling I got from them, you know? But I have no way of proving it, but a couple of them were like "oh! It's due tomorrow?!" and they came up with the project, so I was like "mmm?" (makes dubious face) because it was supposed to last 7 days, you know... but all together I think the trash project with the entire unit (theme) planned around it was like the sinker

OK, how important do you consider this activity with respect to helping them undertake a more sustainable solid waste practice?

Teach: I do think is a step stone, I think it would require follow up activities... If I had more time since it was the last trimester, I would have actually put them to recycle and taken them to a recycling plant for them to see the amount of energy that it takes to recycle these products because is very expensive, because it still takes a lot of time, and it still causes pollution. So I would've liked them to have a little bit more, but it was definitely a step stone to something bigger

Ok, so you think that this is something we could include if we were to do this on a yearly basis that would be something that you would consider including, like a tour to a recycling facility and actually having them take a look at what exactly it takes to recycle?

Teach: Yes, and we actually just incorporated it into next year's plans for science fair different themes as part of the Globe program and we want to get sponsorship, and one of the themes is recycling, 7<sup>th</sup> grade would actually physically be recycling, and looking for what the most effective way to recycle here at school, so they would be exposed to it next science fair, so next year they would actually see the effort that it takes to recycle, so that they can make those connections...

Ok that would be awesome, you're telling me that you would be doing this with the Globe project?

Teach: yeah!

OK, how many grades are involved in that?

Teach: We have 4 teachers that are certified right now, so we are officially a Globe school, we have to find cross curricula for about 6 or 7 grades to be able to do it, because is basically the same standardized steps and then reporting results in the Globe format.

Cool I am so glad for you guys! Ok, do you think that the students will replicate this activity at home, maybe not to the extent that they did it in the school, but maybe at least try?



Teach: I think that they are more conscious about what they put in the trash, we do have a recycling program in place, they are more conscious about, this goes in this trash, and this is a bottle this goes in that trash, but at home I didn't feel that the type of society we're dealing with they just throw the trash, and the nanas or the maids take care of the rest, so I don't think this something that we could actually do at home... I think that at 7<sup>th</sup> grade they are already a little bit too old to change their habits, but I do know that with the other program we're doing recycling with 4<sup>th</sup> grade, they're already taking changes at home, so I think that if we started earlier we can change their living habits, versus just their habits at school, I think that in 7<sup>th</sup> grade... I don't want to use the word spoiled, but (laughs)...

Ok, well this is a question just to confirm, but I know you and I know you already do this ... Did this activity motivate you to try to assess or reduce your waste production at home?

Teach: we usually do, I get screened by my fiancée because I collect trash, so every once in a while, I get home and it's gone! But I do, I do practice these habits at home, and I try to reuse as many things as I can...

I know I just wanted to have it here "for the record" (both laugh) Ok, do you consider that reducing the amount of solid waste we produce is a helpful practice for the environment?

Teach: I think is very helpful but I think that in this country is very difficult... For example, they're not accustomed to using glass containers something that we can reuse and disinfect over, and over, and over again, and it's pretty in terms of aesthetics... but they don't sell a lot of glass containers, most of the things are either cardboard, plastic, and they don't reuse it because they think it's ugly, plus it gets easier contaminated because it grows bacteria, but if there were more glass containers there would be easier to reduce, to reuse, and in this culture is very, very, very difficult...

Yeah I would say in every culture...

Teach: Yeah but in the States people have an excess of topper ware, and that's a way of reducing, but here I see the foam cups and containers everywhere...

Oh yes, we live in the culture of the Styrofoam...

Teach: Exactly if Styrofoam would be gone from this island that would be great

Ok, so what is your perception of the interest or the support that the parents provided to the activity if any?

Teach: (makes disappointed face)... I actually felt a lack of support, more of antagonizing the situation...

Did you have a lot of parents asking you, why is my kid dealing with garbage...?

Teach: yeah, exactly, that it was not hygienic, there was actually one complaint that "la nana (the nanny) lo saca por la maniana" (takes it (garbage) out in the morning), she can't wait till 2:30pm to take out the trash, (laughs as if surprised), I mean is seven days of your life! So I had a couple of challenges, when I tried to plan a fieldtrip to go see a beach that is completely contaminated with trash and is not because anybody put it there is because the ocean current brought it, but then we had to talk about how does trash move, how does trash gets from place to place, that was a mess, I had to cancel the trip, we had 30 parents calling, why are they going to Laguna Oviedo, why are they going to that trash place? What's the point?

Do you think that this is an urban, I want to say like an urban driven situation, like is out of sight aout of mind, but given the state of the city of Santo Domingo, you can see trash everywhere, this is no joke, so is not out of sight

Teach: NO I think that is deeply ingrained, I think that many people have the mentality that is not affecting me, is not affecting my kids, I don't have the trash in my house so what do I care? I

think that is at a much more ignorant level, I don't think "out of sight, out of mind" actually has some logic behind it, at least you don't think about it because you don't see it, but here, we see it all over the place, is a very, very big situation, and they don't see it, they don't see the importance behind it

Yes and they don't think that they have anything to do with it, that they're not causing it because they put the trash where it belongs and the garbage truck comes picks it up, but they don't really know what happens to it after that...

Teach: and the generation of parents of the seven graders they weren't taught about trash, they weren't taught about population, they weren't taught about the environment, so they believe if I don't know it why should I care? I think is a very deeply embedded situation, which is if we talk about history, we're just starting now to educate about the environment, so maybe this generation's kids will be able to get them into this environmental education...

For next year, what do you think we could add, how do you think that we could improve this situation for parents being adamant to having their kids, approach, and tackle this?

Teach: I would love to have a good answer for that, I mean they've done seminars here about healthy eating, and they've done seminars about bullying, they done seminars about a lot of other issues that are important so perhaps we should hold a seminar, but then again, we hold a seminar, and out of 300-400 parents, only 3 or 4 show up, so I mean it is important to provide the opportunity but I don't know how to stress the importance of it. I hope that with next year's science fair the school is really going to take notice that we're green, and we have plans to build windmills to power the school with 11<sup>th</sup> and 12<sup>th</sup> grade, and I am hoping at that point they will be like "woah, the entire science fair is focused on the environment" so I am hoping that should do it...

That's going to be something that hopefully would open the parents' eyes

Teach: I hope that at least will open the curiosity and maybe sometime after the science fair have the parents' seminar so maybe now we can strike the interest and maybe sink them with an actual presentation

Science fair is 7<sup>th</sup> – 12<sup>th</sup>?

Teach: yes

Ok, yes I mean, one step at the time, this is the first time that we're actually assessing the activity and the results, I think that is a start

Teach: Definitely, we had to start somewhere

Yes, and I am going to tell you that the year that I did it I had the same issues, I had parents calling me "why is my kid dealing with garbage?" "why do we have to?" and I remember sitting down with Carla, and talking to them and saying this is part of the grade so they're going to have to do it" but it was more like "suck it up because this is going to happen" but I didn't really know how to get this parents involved, and how to get them to care... that is where we are right now, if the parents don't care, the kids are going to care less..

Teach: and another situation I had was when I was trying to take them to Laguna Oviedo, you know the "yolitas" (small motor boats) are limited, so when they asked if they could go, I said, "sure you can go, I just don't know how to get you to playa Mosquera, and then they were thinking that kids were going to drown! It's about 10ft deep! So I think that if we found a way to go to playa Mosquera with the 7<sup>th</sup> graders that would be even more impacting, maybe they would say "oh nobody put this here? How did it get here?"

Do you what I was thinking, last Summer when I was there and I got there and I saw Guibia and all the coastline of the Rio Ozama, and it was just like a sea of garbage literally...

Teach: But these kids see that and they blame people, so I was trying to take them away of the situation were they could say, ok now whose fault is it? How did it get here? And then make the connection of the leather back turtles which are leaving the island we only have about 4 females coming a year, and they have to dig through trash to lay their eggs, and the babies have to dig out trash be able to get out of the nest so I think that to actually getting them out of blaming someone and see the damage that it can actually cost , and if we could get the parents in on that I think that we could really impact, because when we went with Deedee to see the turtles the only thing I could think of was trash and we weren't there for trash! And even from Google Earth you can see the trash!, that's what I used as a substitution a presentation with Google Earth so that they could see how trash gets accumulated which directions the currents go, but if the parents could see that, "se caen" (they flip)...

I would like to think so! So over all you think that this activity should be continued in the future?

Teach: yes, definitely, I think that if we could get the parents involved that it would be much more effective

Yes me too, that should be a priority try to get as many parents involved as possible

Teach: Maybe we should promote the garden project at the science fair so that we get people motivate to get motivated to look forward to working with trash, I am hoping to use the science fair as a tool to reel people in!

I think that it could work, hopefully, seeing that the school is definitely heading towards the green direction, and maybe parents will pretend they're more interest

Teach: Or at least be more accepting!

I appreciate everything you've done! Thank you so much!

## Appendix 34

### 8<sup>th</sup> Grade Teacher Interview Transcript

How well do you think that the activity connected with the Work and Energy theme?

Teach: I think that the way we did it because I wanted to give you the feedback, I should've waited till the very end and give it when it was supposed to, I think they (students) would've had much more to work with, plus much more experience, basically doing science.

Ok, so you think that it would've gone better if you would've saved it for last?

Teach: Not for last but where I had it planned originally, because you know, 8<sup>th</sup> grade, these kids is like the first time they see things like units (measurements) and if you rush them into it they don't get a full comprehension of exactly what they're doing.

Ok, yes I know, besides that what do you think were the biggest challenges for the energy audit activity?

Teach: Well you can imagine doing an energy audit in a place where there is no stable energy source, that itself was the beginning of the problem, if we noticed that if you tried to do a real energy audit it was almost impossible, it was a difficult thing to do because you have to also take into account the money that you spend in the generator and the "inversor" (inverter)

I remember that that was the original idea and I remember you telling me something about not being able to do that

Teach: Yeah because I presented it to (staff member) and I don't know she felt like it was going to be a lot of work for the people who are taking care of that right, I don't know, I guess she didn't have the foresight to see that she might have actually extracted some information and be able to save money, you know... Like she knows how much she spends on petrol a month, but she can't make an estimate because of the irregularity of energy here.

Yeah, that's what I thought was the main issue, since you don't have the same supply per month it was going to be, she was going to have to go through some of the bills to be able to come up with a reasonable estimate.

Teach: Yes and another thing is that those bills, are only logged in for like three months back Yes and it was going to make your life impossible... (both laugh) what challenges did you come across in terms of the students attitude towards the whole energy audit?

Teach: Initially they were like, "oh great more work"... but then when they got to the part of the fluorescent and incandescent light bulbs, which ones are more efficient, which ones are less efficient and they saw that they actually cause an impact on their energy bill at home that's when they actually got interested

When I talked to the group that I interviewed they were actually very helpful, they acknowledge the fact they had managed their perception and attitude and almost all of them were doing reducing their consumption at home which is actually great.

Teach: yes when I asked them to bring their electricity bill they looked at their electricity bill and knew what they were paying and already at this point they had some idea of what a KW-h was, and then we began to do the audit here in the school to see what the average consumption would be, and we calculated with the three backed bills they had here, and they were less deceptive because the calculations more or less matched, I asked them to do the same at home, and then they did the analysis, some of them changed the light bulbs at home, one of them had as many as 18 incandescent light bulbs at home, so his father changed them and saw a significant change in their bill... it was enough to shock them

Yes and even if it would've been a little it reduced something!

Teach: Yes, definitely!

How do you consider this activity with respect to helping the students reach a more sustainable energy use?

Teach: I think that they didn't really get the concept of what sustainable is, they left with for sure, that they can make an impact on their personal life by performing energy audits, I showed them where energy comes from, how energy is extracted, and how things look like after things are extracted showed them a picture of a before and after a coal mine, it tears up the landscape What about in terms of being aware after the activity, are they I wouldn't say scientifically aware, but at least socially aware they consume energy, and where they could save..

Teach: I would say that a good portion of them had that for a minute, but living in the society that they live in the culture, going back home, I'm sure they're not turning off lights or trying to save the world

OK, that's the perception you have?

Teach: Yes, and I say that because they leave the lights on in the school when they leave, they don't turn off the computer, or flip that switch that really didn't happen, but the reason that I think that didn't happen is that we can teach them here, but what about when they get home? You know?

So you think that maybe you didn't have support from the parents?

Teach: I definitely think that, one rotten apple is going to make a bunch of other apples bad Do you think that the students are replicating this activity at home or you think that that's not going on?

Teach: I think for the first months, 2 months that we were working on that they were doing it, after it happened maybe 50% were doing it and towards the end of the year maybe 5% were doing it, they had moved on to other things...

Al right did this activity motivate you to try and reduce the energy consumption in your own household, and I am pretty sure that you already did that before me asking you the question?

Teach: Originally my light bill was like, 700.00 pesos and then we got a an inverter that ran on like 8 batteries, after installing that my light bill went up to 3,500 pesos, I took that off the very next month, and now my electricity bill is down to 600 pesos again!

That's a pretty decent energy bill I must say!

Teach: We don't have AC, and if we're not in a room nothing is on, and I have energy saving everything!

Yes, I'm pretty sure you did this before this!

Teach: yes, I kill the breaker switch when we go on vacation

Ok, what is your perception about the support that parents gave to the activity?

Teach: I want to say that the parents that I got to speak to, they were very surprised that I had them running around doing this, some of them were like, I'm so glad that you did this it helped me out a lot, but I am sure that even though they that they were not like 100% interested in the project, nobody was calling to help me out

How many students did you have in your group? 23 right, because we only got like 7 consents back from their parents

Teach: ok well listen to this, I have to tell you this, we went over their energy bills and some of these parents are paying over 100,000 pesos, alright, maybe that's part of the reason, it's a bit excessive! When you compare mine with theirs! This people have central AC, water heaters, pool, etc... all the time

I was thinking about that when I was trying to account for the people who didn't give consent and trying to think of why, and that occurred to me, that that might one of the issues...

Teach: Of course! Nobody wants to divulge their excesses!

It must have been hard for parents to give consent for the kids to go and say that they pay 100 thousand pesos a month in electricity

Teach: and they're wasting like 5 people's regular salary on it! You know in a month that is wasting because they don't need that much, I won't confirm it, but in all likelihood that is what's going on! I saw some of these energy bills "y me dio un yeyo" (and I was shocked)

And parents are aware of this they pay the bill so they know about this!

Anything that you think should be included in the lesson plan or excluded for next year to improve the whole experience?

Teach: I think that what we really need is a little bit more organization in terms of collecting the data, they should have charts prepared for the generator, when is it on, for how much time, how much gasoline was bought, when, they should have an average of what the fuel consumption is, they should be able to say how many KW-h can you run until you have to do it again, they don't know that yet

Do you think at some point you or the students could have a meeting with staff member and discuss this like having a chart

Teach: we did charts, of what the average consumption was of each unit, we did histograms of  
....

So you did have this conversation with (staff member)?

Teach: I had I presented this, and they saw it as an investment they needed to make, I think they lacked the foresight to see the money they could save, having an efficient school, and if kids have suggestions regarding their measurements and they should follow up on it, they have more interest and I feel that in this project that didn't happen (speaks Spanish), in the garden they had the kids running around and they had everything, but when it came to the energy it was stop, and wait type of thing.

Ok, do you think that the activity should be continued in the future?

Teach: I think so, but that we must follow suggestions like coming up with the chart, being on board, and helping with the people who are in charge of that but won't understand why they have to do this extra work... Those people with aid can do the job...

OK, do you think that it would be wise to bring somebody to talk to them?

Teach: I think that maybe one day we could have a meeting about that, educate them, they're dealing with it.

Thank you so much for everything.

## Appendix 35

## Skype Focus Groups Codified Data

Skype Focus Group Codified Data							
5 <sup>th</sup> Grade: Composting		6 <sup>th</sup> Grade: School Garden		7 <sup>th</sup> Grade: Garbage Project		8 <sup>th</sup> Grade: Energy Audit	
Gender	Question A	Gender	Question B	Gender	Question C	Gender	Question D
M	YES	M	NO	F	NO	F	NO
M	YES	M	NO	F	YES	F	YES
M	YES	M	YES	F	YES	F	YES
F	YES	M	NO	F	YES	F	YES
F	YES	F	NO	F	YES	F	YES
M	YES	F	YES	M	YES	F	YES
F	YES	M	NO	F	YES	F	YES
F	YES	F	YES	F	YES		
F	NO	M	YES	F	YES		
F	YES	M	NO	F	NO		
F	YES	M	NO	F	YES		
F	YES	M	NO				
F	YES	M	YES				
F	YES	F	NO				
F	YES	F	NO				
M	YES	F	NO				
F	NO	F	NO				
F	YES	M	NO				
F	YES	M	NO				
M	NO	M	YES				
M	NO	M	YES				
F	YES	M	YES				
		F	YES				

Question A: Did the composting project made change your mind about the way you saw waste and composting?

Question B: Have you started growing vegetables at home after the School Garden Project?

Question C: Did the garbage project made you change the way you and your family dispose of your garbage?

Question D: Did the energy audit project made change your mind about saving energy?

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5<sup>th</sup> Grade Composting Project

[http://www.youtube.com/watch?v=ZAMy\\_ZJ0Xa8&NR=1&feature=fvwp](http://www.youtube.com/watch?v=ZAMy_ZJ0Xa8&NR=1&feature=fvwp)

<http://www.youtube.com/watch?v=VoNCIpV505k&feature=related>

<http://www.michigan.gov/kids/0,1607,7-247-49067-62499--,00.html>

<http://www.epa.gov/osw/conservation/rrr/composting/basic.htm>

<http://compost.css.cornell.edu/quiz1.html>

<http://www.littlerotters.org.uk/pdfs/Wheretoputcompostbin.pdf>

6<sup>th</sup> Grade Garden Project

[http://communitygarden.org/gardenmosaics/pgs/action/Action\\_Summary.pdf](http://communitygarden.org/gardenmosaics/pgs/action/Action_Summary.pdf)

[http://communitygarden.org/gardenmosaics/pgs/action/Action\\_Planning.pdf](http://communitygarden.org/gardenmosaics/pgs/action/Action_Planning.pdf)

[http://communitygarden.org/gardenmosaics/pgs/action/Action\\_Planning.pdf](http://communitygarden.org/gardenmosaics/pgs/action/Action_Planning.pdf)

<http://www.kidsgardening.org/activity/design-your-own-garden>

<http://www.littlerotters.org.uk/pdfs/plantgrowth.pdf>

Grow the Planet: <http://beta.growtheplanet.com/en/learn>

### 7<sup>th</sup> Grade Garbage Project

<http://www.youtube.com/storyofstuffproject#p/u/22/9GorqroigqM>

<http://www.youtube.com/watch?v=mU9LpxctuQw>

<http://www.epa.gov/osw/education/pdfs/resource.pdf>

<http://www.epa.gov/osw/education/pdfs/lunch.pdf>

<http://www.youtube.com/watch?v=lmD9IJh1Cr0>

### 8<sup>th</sup> Grade Energy Audit

[http://www.earthcarecanada.com/earthcare\\_program/Lessons/8\\_types\\_lights.pdf](http://www.earthcarecanada.com/earthcare_program/Lessons/8_types_lights.pdf)

### **Personal Communications:**

Checo, R. (2011), Current member of the Environmental Education Department at the Ministry of Environment and Natural Resources of the Dominican Republic. Contacted in various occasions through August, 2011

Edward, V. (2011), Current member of the Environmental Education Department at the Ministry of Environment and Natural Resources of the Dominican Republic. Contacted in various occasions through August, 2011.

Guerrero, A. (2011). Former member of the board to approve ES as a transversal axis for the ME. Contacted Jan 21<sup>st</sup>, 2011.

### **Emails:**

Mena-Tamayo, O. (2011). Current member of GIZ in the Dominican Republic. Contacted via Email Jan 27<sup>th</sup>, 2011.