Semilla: A Community-University Partnership for Environmental Education

Report of Major Portfolio submitted to the Faculty of Environmental Studies in partial fulfillment of the requirements for the degree in Master in Environmental Studies

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Foreword

My area of concentration within my Plan of Study (POS) explores different perspectives in the production of knowledge and knowledge exchange specifically related to environmental education. Within this portfolio, I have included all the major themes set out in my POS. In addition, the learning components outlined in my POS have theoretically supported this research project portfolio. In general, I am interested in understanding best practices in the production and implementation of environmental education with special attention given to family programs. Within my environmental studies component, I gained an understanding of the many interrelating aspects which make environmental studies interdisciplinary by nature. This understanding was supportive in examining the many different theories and approaches behind environmental education. My increased understanding of the complex nature in developing a holistic approach to environmental education has significantly impacted the direction I took in taking on a community-based participatory action research project using a community engagement initiative in the form of a co-developed environmental education resource. An important theme in my POS was examining the production of knowledge and knowledge exchange which was then used as a suitable approach within the co-development of an environmental education resource. Another key reason the research portfolio project took place in the form of a community engagement initiative was to better understand best practices in knowledge production within community-university partnerships through the exchange of knowledge. The themes of environmental studies, knowledge production and environmental education within my POS continued to be explored throughout the portfolio project in examining the exchange of knowledge between communities and universities in the co-production of a community-based environmental education resource.

Abstract

This portfolio is a collection of pieces from a community-based participatory and action research project called Semilla: A community-university partnership for environmental education. Semilla is a project that began in February 2017 with communities in The Alexander Skutch Biological Corridor [ASBC] in Costa Rica and graduate students (Olivia Caravaggio and Natalie Cummins) from York University. The project aims to understand the impact of a community engagement initiative on community-university relations. The community engagement initiative is a partnership between graduate students and the community to develop an environmental education resource. To identify changes in university-community relations, we investigate: (1) community members' perspectives of York University and community-university relations before participation in the development of the environmental education resource; (2) community members' perspectives of developing the environmental education resource; (3) community members' perspectives of York University and university-community relations after participation in the development of the environmental education resource.

This portfolio includes a culmination of activities completed in (1) and includes voices from 49 community members and school staff and 143 students. In total, 192 participants contributed their ideas to this first phase of the project. This portfolio includes: (a) the environmental education resource developed with the community called Semilla: An environmental education resource; (b) a findings summary of community perspectives of York University and community-university relations called Community-university relations and partnerships in the ASBC: Community voices and recommendations; (c) a video that describes the development of

the environmental education resource. The intended audience of (a) and (b) are the general community in the ASBC and at York University, while the intended audience of the video (c) is students. In the video, we aimed to demonstrate how students' voices were used in the development of the project and honour their contributions.

Community collaboration, honouring the voice of the child, and knowledge exchange and mobilization are all priorities in this project. For this reason, all project pieces shared in this portfolio have been translated and will be shared at a knowledge mobilization event at the York University's EcoCampus on December 8th, 2017. The event is open to all community members in the ASBC. At this event, we will be sharing and distributing the environmental education resource and the community-university relations findings summary, as well as screening the video.

Findings in phase one of this project contributes to knowledge surrounding environmental education curriculum and pedagogy and community-university partnerships. In the development of the environmental education resource we found that community members are interested and eager to continue and expand environmental education in their communities. We found that communities are interested in the following environmental topics: water, trees and plants, animals, waste, agriculture, and interconnectedness. In considering community-university relations we found that community members are interested and eager to partner with York University more. Community members also shared recommendations for York University's work in the community. It is the hope that these findings will contribute to continued partnership, collaboration and knowledge exchange between communities in the ASBC and York University for environmental education and beyond.

Our Collaborative Process

Throughout the development and implementation of this portfolio we were constant in our collaborative approach. In our first meetings where we began to develop and plan for the project, it quickly became clear that the scale and nature of project would require a team to see through. Throughout the project we met frequently to discuss next steps, make decisions and debrief on the project's activities. With support along the way from many faculty at York University and community members in the Alexander Skutch Biological Corridor, the project fulfilled its goals. As project leads, we collaborated in every stage of this project, in data collection, data analysis, writing, and in knowledge mobilization.

In the data collection stage Olivia brought her experience in community/family programming and community outreach and Natalie brought her experience in research. This partnership proved to work extremely well, where Olivia could take the lead in community engagement and focus group and interview facilitation, acting as a liaison between the project and the community. Natalie could then take on more of a research management role, where she managed data collection materials, collected data and data collection practices. We also hoped to learn from one another and build our capacities in each other's role by often switching roles and supporting one another throughout the process. Our collaboration also proved to be important in data collection for the purposes of translation. Although we both spent time learning and practicing Spanish, Olivia had a stronger base and could facilitate focus groups, interviews, and consultation sessions with students, which then allowed Natalie to document the project process by taking notes and photos during data collection. This also allowed to create a more relaxed,

natural experience for participants where Olivia could constantly be engaged with the participants while Natalie took more of an observer/note taker role.

In community-based research community relationship and partnership building is extremely important. Without our collaboration, we would not have had been able to be as involved with the community as were able to be. During our time in data collection we had pre-data collection meetings about the research with members of the community, we conducted focus groups, interviews, and student consultation sessions, and we had feedback meetings with all participants to share our analysis methods and give space for feedback. We were also able to take part in additional community engagement activities, including running a weekly family program at La Casita Azul, leading two environmental education days at local schools, leading an arts-based program at a school where we worked with students towards a final performance at the annual Alexander Skutch Festival, and attending various community events throughout the data collection period. These efforts helped to build relationships that were integral to the community partnership that was at the centre of this work. Overall, working as a team, we were able to achieve more during our data collection period and become more involved in the community.

In the analysis stage our collaboration was extremely important because of the amount of data collected. We spoke with 192 people which resulted in 25 transcripts and 143 drawings to code. We used methods drawn from grounded theory to analyze this data, where we developed a coding guide to analyze the transcripts. Having two people work on analysis was important for ensuring we were able to finish the project in a timely manner, but also for inter-rater reliability. We always analyzed the documents side-by-side so we could discuss any discrepancies in how we were coding. We also coded a few of the same transcripts at the beginning of our analysis to compare our codes and ensure our understanding of the codes were the same.

We also collaborated throughout the writing stage of the project. As you can see in the chart below, after developing the outline of the documents, we were assigned certain sections. Still, although one of us would take the lead on separate sections, the other would always review, edit and provide feedback where necessary. The development of the video happened in partnership, where we both chose pictures, videos and music, and wrote the script together.

Finally, we were also able to return to the Alexander Skutch Biological Corridor and hold a knowledge mobilization event at the EcoCampus where we presented the findings, shared the video of our process and shared hardcopies of all the portfolio pieces. About 70 members of the community attended, and for many of them it was their first time visiting the EcoCampus. Without our partnership and collaboration, we are sure we would not have been able to see the project to its end, where we not only completed the academic requirements of the portfolio, but also ensured the knowledge produced was shared with the community, one of the most important pillars of community-based participatory research.

Description of Division of Tasks

Semilla: An environmental education resource

- A Beginning
    - The ASBC – Olivia Caravaggio (OC)
    - Project Description – Natalie Cummins (NC)

- Community Voices
    - Importance of Environment - NC
    - Current Environmental Education - NC
    - Community Thoughts on Environmental Education
        - Headers 1-3 - OC
        - Headers 2-5 - NC
    - Pedagogical Approaches to Education
        - Headers 1-3- OC
        - Headers 4-6 - NC
- Water Introduction - OC
    - Water Activities – OC
- Trees and Plants Introduction – OC
    - Trees and Plants Activities - OC
- Animals Introduction - NC
    - Animals Activities - NC
- Waste Introduction - OC
    - Waste Activities - OC
- Interconnectedness Introduction - NC
    - Interconnectedness Activities – NC

Community-university relations and partnerships in the ASBC: Community voices and recommendations

- Introduction – NC
- Context – OC
- Community-university relations – NC
- The Current Project – NC
- Community Voices
    - Headers 1 – 3 - NC
    - Header 4-7 – OC
- Recommendations – NC & OC
- Conclusion - NC

Semilla Video

- Both OC and NC completed the video together.

AN ENVIRONMENTAL EDUCATION RESOURCE

EDITION 1

DEC 2017

OLIVIA CARAVAGGIO, RECE, MES (CANDIDATE) & NATALIE CUMMINS, RECE, MES (CANDIDATE)

"You can sow that small seed and all the children, maybe ten or maybe more, can have that seed, and that need, and the desire to go together and investigate."
- Community member

"The children are watching and having more sensitivity as they sow. More touch and feel. More contact with nature and [they will] defend it. Because from there up is the future. We have to start with them. For if we teach them well, they will be straight trees. They will not be twisted because they will take care. If they see someone throwing trash… they are going to protect nature."
- Community member

"Some may say, 'Ah, [the outdoors is] dirty and there are too many insects. So I think if you can get a core group of children that would be really interested and they start telling their friends about it, then I think it would grow."
- *Community member*

"That's why I always say it's very important, [*Semilla]*. Maybe you feel that you are not doing too much but you're planting a seed that, it will grow. Maybe not in one year or two, maybe it will take longer, but it will grow."
- *Community member*

Acknowledgements

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Asociación de Mujeres Unidas de Quizarrá [AMUQ]
Coffee Pan
Consejo Local del CoBAS
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Diandra Arias and her family
Dorothy Windsor and Bruce Windsor
Escuela Santa Elena
Escuela Quizarrá
Felipe Montoya
Howard Swartz
Gabriel Barboza Villaloboa
Grettel Fonseca and her family
Guisselle Vargas Vasquez, Miguel Arias Valverde, Fabricio Arias Valverde, Tanya Arias Valverde y Dayana Arias Valverde
Jeannette Montero Cailiano
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This resource

Semillia is a resource developed in partnership with three communities in the Alexander Skutch Biological Corridor (CoBAS). The purpose of this resource is to couple community thoughts about environmental education with practical experiential learning activities that can be used in a variety of settings, such as libraries, events, schools, and homes. The resource begins with a description of the project process, followed by a summary of community voices and thoughts on environmental education. The activity section begins on page 19. This section highlights the six most spoken about environmental education topics. These topics are: Water, Trees & Plants, Animals, Waste, Agriculture and Interconnectedness. Each section includes a summary of what the community said about the specific topic, followed by the topic activities. This resource is a working document. It is the hope that as environmental education continues in the communities, this resource will also continue to grow, with the addition of important environmental topics, new ideas and more activities for practice.

A Beginning

Semilla is a result of university-community partnerships in the Alexander Skutch Biological Corridor (ASBC) that brought together community members to talk about environmental education.

These passionate community members, whose interest in finding and implementing new ways to make quality environmental education happen inspired the creation of Semilla.

From February to May 2017, community members from three towns in the Alexander Skutch Biological Corridor (ASBC) came together in focus groups, interviews and consultation sessions to talk about environmental education. Community members considered questions such as, "what environmental topics are important to this community?"; "what kind of environmental programs does the community need?" and "In what ways should children be taught about environmental education?"

These thoughts and ideas were brought together to create this resource, *Semilla*. *Semilla* shares the voices of the three communities on the topic of environmental education and connects those thoughts with activities and projects that can be used in existing environmental education efforts in schools, at community events, at festivals, in libraries, and in homes. *Semilla* is a beginning, a seed for environmental education, environmental action and partnerships within communities; something that can grow and make change as it is practiced and continually developed.

The Alexander Skutch Biological Corridor

The ASBC is an area that was created in 2005 when 7 communities came together to support the Tropical Science Center/Centro Científico Tropical (TSC/CCT) and the Las Nubes Biological Reserve (Rapson, Bunch, & Daugherty, 2012; York University, 2017). The ASBC aims to increase connectivity along the Río Peñas Blancas between various conservation areas and parks that work for wildlife and environmental conservation including Los Cusingos Bird Sanctuary (at the southern end of the corridor), Las Nubes Biological Reserve, and Chirripo National Park (at the north-eastern end of the corridor) (Daugherty, 2005; Rapson et al., 2012; York University, 2017;). The corridor is named after Alexander Skutch, a world-renowned ornithologist who lived in the corridor from 1941 until his death in 2004 (Martinez & Saker, 2012; Rapson et al. 2012).

Project objective

The purpose of this project was to create a community-developed environmental education resource that can be widely used in the ASBC.

Through university-community partnerships, the project aimed to investigate community members' perspectives on the following questions:

- What topics should children and families be learning about in environmental education?
- In what ways should children and families learn about the environment?
- What are local families, children, and community members interested in? What do they like to do?

In efforts to make a document that was not only relevant in terms of its content about environmental education, but also something that included activities that children and community members would enjoy, questions were asked specifically about environmental education and more generally about community and family likes and dislikes.

Collecting Voices

Project participants:

From March 17th, 2017 to April 22nd, 2017, those who contributed included:

- community members
- school staff
- and, students

Semilla includes voices from 49 community members and school staff in 10 interviews and 6 focus groups as well as 143 students in 2 schools. In total, 192 participants contributed their ideas to this resource.

Methods

Community members and school staff

In semi-structured 40 minute to hour and a half long focus groups and interviews, community members and school staff were asked about:

- Current and past environmental education in the community
- Family environmental education and intergenerational learning
- Benefits/challenges to environmental education
- Pedagogical approaches to environmental education
- Environmental topics of priority to the community

Students

Student consultation sessions happened on school grounds. It was important to give students options in how they chose to respond to the project's questions. In consultation sessions students could choose to respond to questions by drawing, writing, speaking, or modeling with plasticine. Providing children with a variety of options as to how they want to express themselves can help to empower the child and give voice to the child. Arts-based methods can give children space to express themselves in a way that is developmentally appropriate (Davis, 2007; Fawcett, 2002; Koppitz, 1983). In this project students were asked the following 3 questions:

- What do you like about the environment?
- What do you want to learn about the environment?
- What kinds of activities do you like at home and at school?

The Analysis Process

All collected data was transcribed and translated. Collected data from focus groups, interviews, and student consultation sessions were analyzed using grounded theory. Grounded theory works to ensure that the findings of a project come from the voices of its participants (Urquhart, 2013). Here is a description of our analysis process:

Stage 1

In stage one we read through each transcript to make note of general themes we saw emerging in the data.

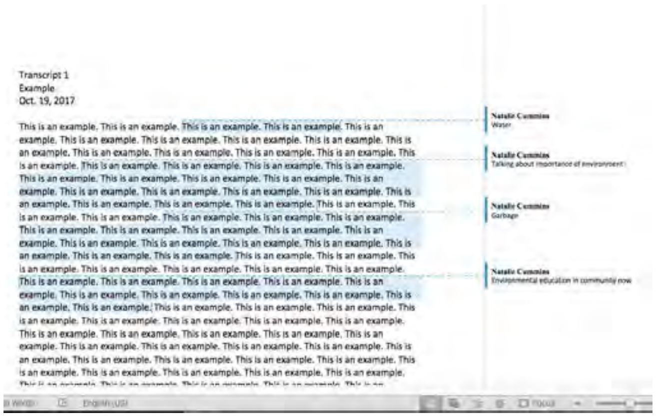


Figure 1. Stage 1 analysis

Stage 2

In stage 2 we printed and cut out all the general themes that emerged from the transcripts. We then organized these themes, grouping them together by similarities.

Figure 2. Stage 2 analysis: organizing themes into groups

Stage 3

In stage 3 we gave titles to each of the groupings we created. These are the themes that came out of community and student voices:

Table 1. Stage 3 analysis: theme categories

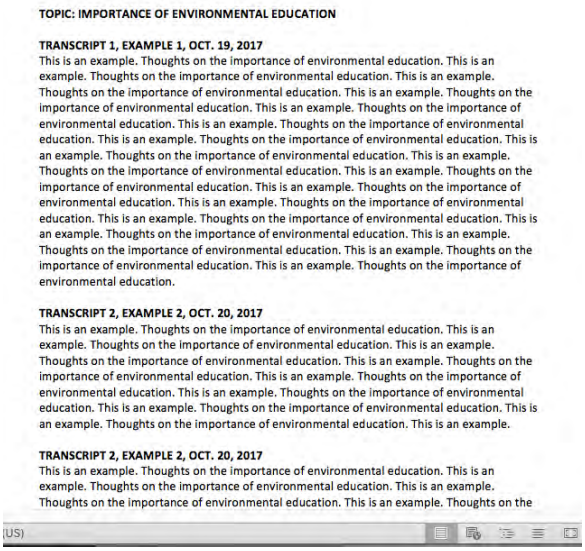
Importance of Environment to Community	Community/Individual Interest in Involvement in EE Program
Importance of Environmental Education	General Thoughts on Pedagogical Approaches to Environmental Education
Definition of Environmental Education	Intergenerational Learning
Present/Past Environmental Education and Pedagogy in Schools	Knowledge Exchange
Present/Past Environmental Education and Pedagogy in Community	Local Knowledge
Community Collaboration in Environmental Education	Topics to Teach
	Child/Family/Community Interests

Stage 4

In stage 4 we read through the transcripts again, with the theme categories in mind. We used a software called NVivo. NVivo allows you to highlight certain sections of the transcripts and place the highlighted sections into theme categories.

Stage 5

With NVivo, we looked at what every participant said about one category (e.g., Importance of Environmental Education) and then work to summarize the all ideas in that category.



TOPIC: IMPORTANCE OF ENVIRONMENTAL EDUCATION

TRANSCRIPT 1, EXAMPLE 1, OCT. 19, 2017
This is an example. Thoughts on the importance of environmental education. This is an example. Thoughts on the importance of environmental education. This is an example. Thoughts on the importance of environmental education. This is an example. Thoughts on the importance of environmental education. This is an example. Thoughts on the importance of environmental education. This is an example. Thoughts on the importance of environmental education. This is an example. Thoughts on the importance of environmental education. This is an example. Thoughts on the importance of environmental education. This is an example. Thoughts on the importance of environmental education. This is an example. Thoughts on the importance of environmental education. This is an example. Thoughts on the importance of environmental education. This is an example. Thoughts on the importance of environmental education. This is an example. Thoughts on the importance of environmental education. This is an example. Thoughts on the importance of environmental education. This is an example. Thoughts on the importance of environmental education. This is an example. Thoughts on the importance of environmental education.

TRANSCRIPT 2, EXAMPLE 2, OCT. 20, 2017
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TRANSCRIPT 2, EXAMPLE 2, OCT. 20, 2017
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Stage 4. Example output of NVivo. one document with all transcript sections themed 'Importance of environmental education.'

Analyzing Students' Drawings

To analyze these drawings we used inspiration from both grounded theory and quantitative content analysis (Drisko & Maschi, 2015; Urquhart, 2013), where we labelled and counted found topics in the children's drawings and then organized those tallies into larger themes. The larger themes that emerged from the children's drawing were as follows:

Activities/Interests

- Games/sports
- Play
- Social
- Arts/fine motor activities
- Imaginary play
- Animals
- Nature
- Insects
- Fantasy
- River/water/beaches
- Vehicles/bikes
- People
- Technology
- Other

Environment

- Animals (including insects)
- Plants
- Flora/fauna
- Weather
- Other

COMMUNITY VOICES

Community members shared their thoughts on a variety of subjects in relation to the environment and environmental education. Here are some highlights.

Importance of Environment

Community members [1] often expressed the importance of their local environment. For some, the environment is important to the community because it is where residents' food and water comes from. For others, it is important because the communities are in the ASBC, which makes the area a tourism attraction and an area in need of environmental conservation and protection efforts. Some community members noted that the natural environment is not only important to the community, but also the country of Costa Rica.

> "The environment is the number 1 [theme] in the corridor."
> – *Community member*

Current Environmental Education in the Community and School

Some community members explained that due to ministry level changes overtime, environmental education is not a single, defined subject or unit in the schools. Other community members said that topics of environmental education are spoken about within other subject areas, such as Science and English. Overall, most community members expressed that there could be more environmental education in school, but also recognize the current challenges that exist within schools around integrating more environmental education, such as adhering to ministry level expectations and finding time within the already busy schedules of schools. Despite these challenges, schools have found creative ways to bring environmental education and opportunities of learning to students. Schools have school gardens, programs and activities around recycling and conservation, parent groups that lead school ground greening projects, and offer field trips to Los Cusingos Bird Sanctuary.

There are several local groups, organizations, and individuals who work to care for the environment and promote environmental education in the community. The communities hold and attend several events that focus on the environment and environmental stewardship such as The Alexander Skutch Festival and the Environmental Festival (which rotates between each town in the corridor annually). The communities have recycling projects, groups dedicated to environmental education (such as the Environmental Education Commission), and has held community workshops on environmental topics such as organic farming. The communities also have ongoing research in the corridor at Los Cusingos and in partnerships with universities.

Environmental education comes in a variety of forms in both the local communities and in local schools in the corridor, and it is the hope that this resource can be an addition to what is already happening.

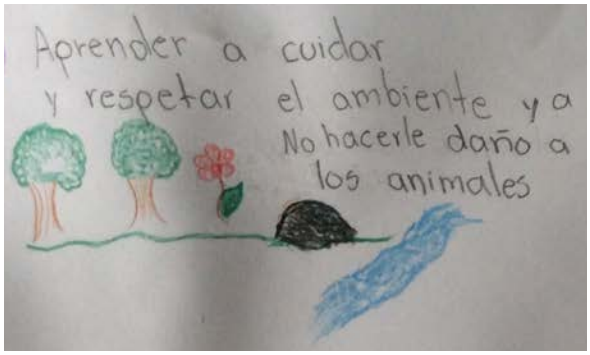
[1] Please note: The term 'community members' in the section Community Voices and all sections that follows refers to and includes both community members *and* school staff who participated in the present project.

Community Thoughts on Environmental Education

Many community members spoke about the need for more environmental education in schools and the community. Here's why they think it is needed.

Environmental Education leads to a better life for humans, animals, and plants

Community members spoke about how environmental education benefits both the environment itself and humans. Animals, plants, and rivers benefit as children learn about how to protect and conserve the environment. Others spoke about environmental education leading to benefits for humans. As we care for the environment more, community members expressed, there will be a better quality of life where humans are healthier and happier.



"That is why it is important for children to start learning and practicing everything about the environment because they are the next heirs of the biological corridor, for all these children to know how important the environment is. Not only for us, but for all the animals in the corridor."
- Community member

"They say that what we know, we love, and if I do not know or [have] interest or know anything of it, I am like blind, and I do not worry about taking care of [it]."
- Community member

Environmental Education leads to environmental stewardship

For many, environmental education is viewed as important because it has the potential to change people's perspectives on the environment and lead towards positive action for the environment. For one community member, changing people's perceptions of the environment is the "most important thing" about environmental education. Community members said that in learning about the environment children will want to take action for the environment through caring, protecting, respecting, and conserving the local environment around them.

"If nothing is done for this country, for this planet, it is going to reach chaos." - *Community member*

Environmental Education for today and the future

Community members focused on the particular importance of teaching young children about the environment. For some, it is important to educate young children because they can bring a sense of care for the environment home to their families and potentially impact family behaviour by encouraging other family members and adults to partake in environmentally friendly practices, such as recycling. One community member believes that adults' beliefs and actions surrounding the environment are more difficult to change than children's. Community members also expressed that it is important to teach young children about the environment because they are the ones who will inherit the environment and are, more specifically, the "next heirs of the biological corridor."

Environmental Education for the Planet

In conversations about environmental education some community members discussed the importance of environmental education on a larger, global scale. Community members spoke about the urgent need for environmental education because of climate change. Community members spoke about how all topics of the environment are related to climate change and the pressing need to change daily practices in all communities around the world for the health of the planet. One community member said it is "no longer whether we should or should not." The push for environmental education from both schools and communities must begin now, for the local environment, for the community, and for the planet.

Environmental Education for the Economy

Some community members spoke about the need for environmental education for the local economy, particularly for local tourism. Community members said learning how to conserve and protect rivers, food, land, and biodiversity is extremely important because it is all "central to tourism." Learning about the land and the local environment is important, explained one community member, so that people can talk to tourists about the place they live. Other community members spoke about the importance of educating children about industries and fields that work to minimally harm the environment, providing examples such as eco-tourism, environmental education, and environmental research.

Pedagogical approaches to education

Community members shared their thoughts about how environmental education should happen and what topics should be included in environmental education.

Where to teach? Who teaches?

Community members felt that there should be more environmental education in both the community and school, however also recognize the difficulty in merging environmental education into the current school curriculum and the lack of time for environmental education within existing academic pressures. Community members are eager to look for creative ways to offer more environment education in schools and outside of school. Many community members are eager to partner with schools by visiting schools for talks about the environment, taking students on field trips, and/or leading workshops for students. Others are interested in beginning and continuing environmental programs and events outside of school. It is the hope that this resource can continue to strengthen connections between community members, community groups, and schools, and continue the conversation about where this type of programming can happen.

Who to teach?

Intergenerational Learning in Environmental Education

Community members thoughts about intergenerational learning were mixed. Many community members believe that teaching young children about environmental education is important because it will encourage knowledge transfer in homes as children will share their new knowledge about the environment and about ways to care for the environment with their families, including parents and grandparents. These community members believe that children can have an noted impact on home environmental practices. Other community members believe that it is difficult to change older adults' thoughts and beliefs surrounding environmental stewardship. These members believe that children will have little impact on home practices. Still, community members said that environmental education for both older adults, young parents, and children is beneficial for the whole community.

What to teach?

Many community members shared their thoughts about the topics that should be included in environmental education, and suggested specific environmental education activities for children and families. These topics and activity ideas are shared in the *Topics and Activities* section. The topics most spoken about were: water, trees and plants, animals, waste, agriculture, and interconnectedness.

"Environmental education is full of topics in one [subject], and it's trying to [teach] how to act in different ways to conserve the land and our corridor"

- Community member

Many community members also mentioned the importance of learning about the local environment, particularly native flora and fauna and the Alexander Skutch Biological Corridor.

"Not many people know about Alexander Skutch, his history, the story, but it is known internationally. People come from all over the world to see the birds and to see where he lived, but the people here don't know about him. It's important to know the history."
– Community member

Native Flora and Fauna

Community members felt that there is a need for both children and adults in the community to learn more about their local environment. A few community members shared how they feel many people in the community have little awareness of the kinds of animals and plants that are in the area. One community member said that in learning about the local environment, people will begin to value to the environment. Another community member talked about how both global and local knowledge is important, however, education should begin with local knowledge. They explained that if children learn about and care for their local environment, the community can be an example for the world and can contribute to global knowledge. Students spoke of wanting to learn about both the local environment and about different environments around the world.

The Alexander Skutch Biological Corridor

Some community members discussed the importance of teaching about what the ASBC is and the history of Alexander Skutch. One community member talked about how the ASBC is known internationally for orthnithology (the study of birds), but is not well known within Costa Rica. A few community members said that it's important to learn about Alexander Skutch's work in the corridor. One community member said that children should know about the research that is happening in the area and about what it means to be a part of a corridor in terms of conservation and protection.

"I mean we can learn about Brazil, the huge place up there and the huge forests that are being destroyed, but what are we going to do from here. Okay, we can be an example, like, alright, here in Costa Rica there is this little community who is doing this change, trying to bring something to the rest of the world and if someone wants to follow it, [they can]."
- Community member

How to teach?

"You have that ease of learning with games and not making everything theoretical. A lot of theory does not matter, let's go to the street." – *Community member*

When asked about how environmental education should be taught, community members talked about the importance of hands-on, experiential, and play-based learning. Community members suggested using games, storytelling, art, photography, and films to talk about the environment. Community members also spoke about the importance of developing activities that are based on children's interests, having opportunities to grow food, opportunities to be outside in nature, going for hikes, visiting farms, and cleaning the river. Other community members mentioned the possibility of projects that partner schools with community groups, such as working with local farms and organizations to plant trees along the river. Many community members said that learning through experience, this "play to practice," is more impactful for children than talks or written work. Community members said particularly when you are trying to change perspectives on the environment and actions for the environment, hands-on experiences are imperative. Additionally, a few community members noted the importance of having experiences in the outdoors in environmental education, with one community member explaining that if you have more contact with nature, you will want to defend it. For another community member, experiences outdoors is important so that children can come to "understand what nature is about, that it's not bad, it's not scary."

This was also reflected in children's responses to questions about what they are interested in. Children are interested in soccer, playing outside, swimming, singing, playing ball, riding bikes, castles and princesses, eating, playing with plasiticine, running, playing tag, playing with friends and siblings, playing with toys (e.g., blocks, toy cars, dolls), playing house, painting, and dancing. In many scenes in children's drawing took place outside, such as scenes of people outside playing soccer, at the river, or with trees. Children said they like to feed animals, listen to the birds, watch the birds, take care of animals, and be with butterflies and flowers.

"I think getting the kids out and camping overnight and look at stars and animals and going swimming in the river, even fishing, anything to do with that I think that gets kids away from computers and cellphones and opens their eyes to what's out there… I think that they then understand what nature is about, that it's not bad, that it's not scary."
- Community member

"Here it would be very important to take them to plant trees, to come together and [on] that, the day of environment, they can take them to plant to a farm or a river and teach them there, because that action is being done at the time. They learn more at that moment and more with the environment and with nature."
- Community member

Based on this community and student feedback, the activities included in this resource are all play-based, experiential, and/or hands-on.

TOPICS AND ACTIVITIES

Water

Water was expressed by community members as one of the most important natural resources on earth and one of the most important topics to teach in relation to environmental education. The majority of community members spoke about the need to take action in water conservation, education surrounding water contamination and most importantly, education about the vital connection between water and life. Students also expressed their interest in learning about water and the rivers in the corridor, as well as water's relation to weather and weather changes.

Importance of Water

When discussing the significance of water in environmental education, community members often spoke about the connection between water and life. Community members highlighted the importance of increasing awareness through education about human's, plants', trees', animals' and insects' dependency on water. Within this dialogue of water's connection to all living things, community members expressed the importance of water conservation, because the conservation of water is the "conservation of everything."

Water Contamination

Community members and students often expressed concern when discussing water contamination. Some members shared their thoughts about the need to clean polluted water and students expressed interest in understanding how to care for rivers. Education on the impact of littering and water pollution was often discussed with a couple members suggesting litter pick up projects on the streets and near rivers. A couple community members also spoke about the need for people to understand the current ways in which water contamination occurs, for example, understanding what happens to waste water and its impact on waterways. One community member reflected on a time when human consumption of water resulted in people getting sick. They continued to express their desire for people to understand that "clean water keeps people healthy." In addition to human health regarding water contamination, a few members also discussed the need to educate about the larger consequences of water contamination such as, loss of plants and loss of wildlife.

Water Conservation

Community members also spoke about the need for education about water conservation. While reflecting on past practices and events, community members expressed the significant importance of students understanding that water is a nonrenewable resource and must be conserved because "without water, there's no way you can make it." As many members shared their concern regarding water conservation education, a few felt it was important for children and community members to be aware of and respect the regulations surrounding how land around rivers and waterways should be protected from development.

Water Filtration

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Goal	To explore topics of water pollution.
Materials	Large and small clear containers, soap/shampoo/shaving cream, pieces of garbage, rocks, dirt, leaves, strainer with small holes, strainer with larger holes, coffee filter, nylon (cut into pieces), oil, pencil, paper
Location	Indoor/outdoor

What would you like to learn about the environment?
"The rivers… because there are many species and animals and when the water is dirty the species die." - *Student*

Instructions:

1) Fill a large clear bucket with water. Add in materials to represent naturally occurring items in water (e.g., rocks, leaves). Then add human waste (soap, toothpaste, etc.).
2) In groups (2-4 people) use provided filters (coffee filter, strainers, etc.) to filter the water as clean as possible by passing the water back and forth through different filters. The group will record their process of filtration and which filter worked best.
3) After groups finish their filtration, compare clean tap water to the water cleaned by the groups.
4) Each group can share their process and results.

Modifications & Extensions

Clean water campaign: Groups can work together to brainstorm ways to keep rivers in the community clean and implement those ideas (e.g., making signs to post by rivers and waterways reminding people not to pollute the rivers).

Discussion Prompts

(Before, after or during activity)

- How difficult was it to clean the dirty water?
- What impact does our waste have on waterways?
- How can we work to keep our waterways clean?

Water Cycle

With inspiration from: Science Doodles (2014)

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Goal	To explore the elements of the water cycle and weather.
Materials	4 clear cups, markers, shaving cream, ice cubes, food colouring, water, clear bowls, plastic wrap, a mug, tape
Location	Indoor/outdoor

Instructions:

Evaporation

1) Fill about 2/3rd of the clear cup with water.
2) Mark a line where the water is.
3) Place the cup near a window or outside on a sunny day.
4) Every half hour mark the water level and record changes.

Condensation

1) Fill 2/3rd of a clear cup with warm water.
2) Place another clear cup upside down on top of the cup filled with water and tape the cups together.
3) Place an ice cup on top of the upside cup.
4) Watch and record. Condensation will begin to form, just like a cloud.

Water Cycle

1) Place a mug inside a clear bowl.
2) Fill the clear bowl with water, covering about 2/3rd of the mug.
3) Draw a line on the bowl to mark where the water level is.
4) Cover the bowl with clear plastic wrap. Tape it to the side of the bowl.
5) Place the bowl in sun to observe and record.

Precipitation

1) Fill a clear cup with water.
2) Spray shaving cream on top to form clouds.
3) Squeeze several drops of food colouring on top of the shaving cream.
4) The cloud will become heavy and create "rain", as the food colouring begins to drip into the water.

Modifications & Extensions

- Extend this activity by taking the group outside to observe and talk about different types of clouds
- Write a story about the life of a raindrop.
- Place a rain gauge outside and keep record of rainfall.

Discussion Prompts

(Before, after or during activity)

- What do you think will happen and why?
- What do you notice?
- How can we keep water clean?

Celery experiment

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Goal	To investigate the importance of water in plant life.
Materials	Clear container (jar/cup), celery stalks with leaves, knife, water, food colouring
Location	Indoor/outdoor

"You won't survive without water… highlight the importance of water."
- Community member

Instructions:

1) Separate celery stalks and select stalks with leaves.
2) Cut about a quarter inch off the bottom of each celery stalk.
3) Fill the cup with water.
4) Add about 4-5 drops of food colouring into the cup of water. You can have multiple cups with different coloured water.
5) Place the celery stalks into the cups, use the celery stalks to stir the water to ensure all the colour has been dispersed.
6) Add more food colouring daily. Observe how the food colouring appears throughout the celery stalk over time.

Modifications & Extensions

- Ask the group to predict what will happen before the activity.
- Keep track of daily observations of changes in a notebook.
- Make a sequence board by taking pictures of the celery as it changes.

Discussion Prompts

(Before, after or during activity)

- What do plants and trees need to grow?
- Why is water important for trees and plants?
- What changes occurred to the celery? Why did this happen?

Water Relay

With inspiration from: Saskatchewan Environmental Society (2012)

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Goal	To encourage water conservation practices.
Materials	2 buckets with rain water, 2 empty buckets, 3 place markers (e.g., rocks), dice, 2 cups with small holes pierced at the bottom, 1 cup with a larger hole pierced at the bottom 3 signs reading: Washing Machine, Shower, Tap
Location	Outdoor

Why is environmental education important?

"For the water. Awareness [about] the water. There is the need to educate them to conserve."

– Community member

Instructions:

1) *Relay race set up*: Put 2 buckets with equal water at one end, and 2 empty buckets at the other end. In between, evenly space out 3 place markers with one sign at each marker. Put the cup with the hole at the "shower" station and the cups without holes inside the water bucket.
2) This activity is a relay race. Split the group into two groups and have them line up behind the bucket of water.
3) Participants will take turns to complete the course. One person from each group will scoop water with the cup with holes and visit each station before emptying their cup into the empty bucket at the end of the course.
4) Before each participant takes their turn, they will roll dice. The dice will determine how many times they have do an action at each station. The station actions are:
   a. Washing machine: Spin in a circle while holding water cup.
   b. Shower: Pour water cup into cup with a large hole and catch water with original cup.
   c. Tap: Hop on one foot.
5) After the participant completes the course and has poured their cup of water into the empty bucket, they can run back to the start line to give the cup to the next player.
6) At the end, see which team has more water conserved.

Modifications & Extensions

To simplify, remove stations in between and only have 2 buckets, 1 with water at beginning and 1 without at end. Place a large cup with a small hole in the bucket with water. Each player rolls dice to indicate if they will walk or run. 1-3= Walk & 4-6= Run.

Discussion Prompts

(Before, after or during activity)

- How can you conserve water when you are washing your clothes, showering, and using tap water?
- What others ways can we conserve water?
- Why should we conserve water?

River Exploration

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Goal	To explore the different ecosystems surrounding bodies of water
Materials	Clear containers (jars/plastic bottles), strainers, coffee filters, magnifying Glasses, trowels, nets, notebook, pencils, insect & animals & tree identification books.
Location	Outdoors by bodies of waters such as ponds, rivers, streams, creeks, oceans etc.

What do you want to learn about?
"The interrelations of rivers"
– *Student*

Instructions:

1) Hike to a body of water.
2) Together discuss safety rules and boundaries.
3) Split group into smaller groups and disperse investigation materials equally amongst groups.
4) Allow groups to explore the area using their different tools and document findings.
5) Discuss findings as group.

Modifications & Extensions

- Repeat activity with a specific focus each time, for example, investigating trees & plants, insects, soil, etc.
- Create a scavenger hunt list.

Discussion Prompts

(Before, after or during activity)

- Where will you find water?
- What are the different bodies of water?
- What needs water to survive?
- How many different living things did you see?

Trees and Plants

Community members often spoke about the importance of education surronding the role of trees and plants in the local environment. Communtiy members spoke about reforestion, the connection between trees and water, conservation of forests, and local trees and plants. Students drawings and conversations reflected the community's emphases on the importance of trees to daily life in the community. When asking students about their local environment and their favourite activities, trees were often a part of their drawings either as the central focus or as a backdrop to outdoor activities such as soccer games and bike riding. Students expressed a desire to learn the names of different types of local flora and about planting trees. Many community members and school staff spoke of the need to teach about trees and many students said they would like to learn more about trees and plants.

Planting and reforestation

Many community members and school staff spoke generally about the importance of planting trees. A few community members discussed the need to teach children about reforestation, while others said it is important for students to learn about the negative impacts of deforestation on the local environment. Some community members said it is important to ensure students have opportunities to learn how to plant trees through hands-on experiences in reforestation. A few community members spoke fondly of memories of when they were children in school and had opportunities to plant trees in their local communities with their classmates and teachers. One community member believed that students will learn more in the moment of planting a tree and through "being with nature" than they might learn with someone talking to them about it. A few students noted the importance of not cutting down trees, with others expressing an interest in learning how trees grow and planting trees with their classmates.

Trees and Water

In students' depictions of their local environments, rivers and trees were often included, with trees often drawn close to rivers. Many community members spoke about the importance of trees for healthy rivers and waterways. One community member said that students need to be taught that trees and water go "hand [in] hand; you cannot have one without the other." Many community members also spoke about the regulations to protect the land surrounding rivers that ensure there are mature trees near the river, which helps keep the river clean. Community members also spoke about the specific importance of planting trees around the river, while one community member talked about the importance of planting trees that are 'good' for rivers.

Local trees and plants

Some community members spoke about the need for children to learn about the types of trees and plants in their local community. One community member said that students should learn about which trees are good for birds, monkeys, and other animals. Students expressed interest in learning about local trees and plants and their names. Some students shared that they want to know about medicinal plants, how to identify trees, which trees and plants are good for birds, animals and butterflies, and what kinds of plants grow in water.

Conservation of trees and plants

In addition to speaking about the need to plant trees, some community members also talked about the importance of caring for trees and plants. One community members spoke about the importance of teaching students how trees can feel, explaining that if you mistreat a tree, you will "get an adverse reaction from a tree, it's alive". Students also expressed interest in learning about how to care for trees and plants.

Planting Plants and Trees

Goal	To investigate how to sow and nurture a seed.
Materials	Seeds or seedlings, paper towel, water, shovels, gardening gloves, pots
Location	Outdoor

"Teach them not only how important the environment is but about the deforestation that there is lately. Help them to forest again, [it's] very important for children to learn how to plant trees."

– Community member

Instructions:

1) If starting with a seed, germinate the seed by folding the seed in a moist paper towel and leave in a warm location. Continue to moisten paper towel until the seed sprouts. Transfer sprouted seeds into small pots. If starting with a seedling, proceed to step 2.
2) Choose your destination planting location.
3) Gather seedlings.
4) Gently remove seedlings from pot.
5) Loosen the roots and soil by gently squishing.
6) Dig a hole big enough for the roots.
7) Transfer plants into the hole.
8) Fill hole with earth. Water plant.
9) If possible, continue to revisit tree and track growth.

"Do not just talk about the kinds and species of trees that are used by birds or monkeys, but go to cultivate with them."

– Community member

Modifications & Extensions

- Create a plant log book: Participants can document the growth of their tree overtime.
- Connect with community members to plant in areas where trees are needed, for example, near rivers.

Discussion Prompts

(Before, after or during activity)

- What does reforestation mean? Who benefits from reforestation?
- What types of trees are important for plants and animals in our community?
- How do you care for a tree?

Hug a Tree

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Goal	To develop skills in local tree identification.
Materials	Blindfolds
Location	Outdoor, in a forested area

Instructions:

1) Take the group to the forested area you wish to explore.
2) Choose an open area as the designated meeting point.
3) Divide the group into partners.
4) One partner will be blindfolded and the other will guide the blindfolded person to a tree.
5) Remind the guide that they are in charge of their partners' safety.
6) The guide will bring the blindfolded partner to the tree of their choosing and monitor safety while the blindfolded partner uses their senses to explore the tree.
7) After a few minutes, the guide will bring the blindfolded partner back to the meeting spot with the group.
8) The blindfolded partner can remove their blindfold and describe what they felt. The blindfolded partner can guess what tree their guide brought them to.
9) Repeat activity and partners can switch roles.

Modifications & Extensions

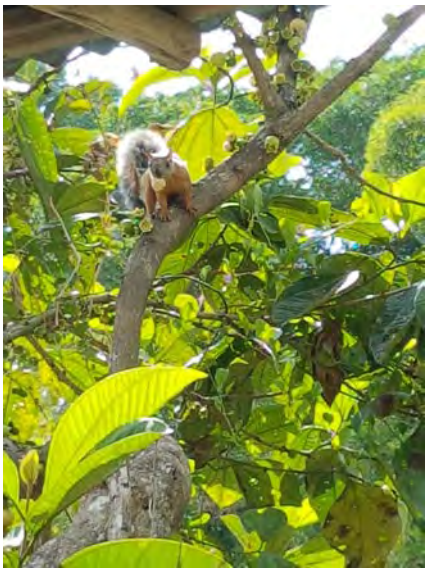
- This activity can be done in partners or groups.
- Bring a tree identification book and identify trees before or after the activity and encourage the blindfolded partner to additionally guess the type of tree they felt.

Discussion Prompts

(Before, after or during activity)

- What kinds of trees are in this area? What are the names of the trees?
- What is different about each tree in this area? What is similar?

Ocelot and Squirrel



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Goal	To develop skills in local tree identification.
Materials	None ☺
Location	Outdoor in a forested area with at least 3 different types of trees

Instructions:

1) Bring the group to outdoor open space where you can identify three trees. Choose three trees to use in the game (each a different type of tree). Share the name of these trees to the group and how to identify the tree.
2) Choose one participant to be the ocelot and explain that the rest of group will be squirrels.
3) Have all the squirrels begin by standing by one of the chosen trees.
4) The ocelot will shout out the name of one of the three chosen trees and all the squirrels must run to that tree.
5) The ocelot will chase and tag the squirrels on their way to the tree. If the squirrels make it to the tree, they are safe. If they do not, they become an ocelot and can help the ocelot catch squirrels.
6) The ocelots together choose the next tree for the squirrels to run to. The game can be played until there is 1-3 squirrels left.

Modifications & Extensions

If there is not enough open safe space for running you can collect leaves and fallen sticks from the 3 trees and place them by a marker (such as a pylon) to represent the tree.

Discussion Prompts

(Before, after or during activity)

- What are the similarities and differences of the 3 trees?
- What are the identifying features on each tree?
- Who do these trees benefit and how?

Talking Trees

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Goal	To encourage environmental stewardship and conservation.
Materials	Sticks, fabric, glue, tape, permanent markers, fabric makers, paint, string
Location	Outdoor/indoor

Instructions:

1) Go on a walk to explore the different types of trees and plants in the surrounding area and community.
2) Ask the group to begin to think about what these trees and plants might say if they had a voice. Collect sticks on the hike for the activity.
3) Discuss the groups thoughts on the voice of trees and plants. On a large board or paper write down the groups' thoughts. You may need to use prompts first, for example a tree or plant might say "please don't break my branches," "I love water" or "please keep my area clean."
4) Participants can make signs with the 'voice' of a tree or plant by writing or drawing on a piece of fabric or paper and hanging on the tree with string or using sticks to stick in the ground.

Modifications & Extensions

Groups can also create garden signs labeling the fruits, vegetables, herbs, etc. Participants can write or draw pictures of what the plants/fruits/ veggies will look like at the end of the season and place them in the garden.

Discussion Prompts

(Before, after or during activity)

- What do trees and plants need to thrive?
- What might limit their survival?
- Trees and plants help us in many ways, how can we help them?

River Stories

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Goal	To understand the importance of trees and water.
Materials	Clay, natural materials & comfortable shoes
Location	Outdoors by a river

"Teach them maybe about [how] trees and water goes hand to hand. You cannot have one without the other."
- Community member

Instructions:

1) Take the group on a river walk and encourage group to observe the trees.
2) Find a gathering location and discuss the importance of trees and water. The group can speak from their observations.
3) Using natural materials and clay, they will now have the opportunity to create a tree character along with a story that explains how that tree character helps or benefits the rivers. They can work in small groups or individually.
4) After completion give the groups opportunity to share their story.

Modifications & Extensions

- As a prompt, tell a story about water and trees.
- Repeat activity by focusing on a specific feature for example, trees & insects & water or trees & floods & water, or focus on specific tree species and their features related to water.

Discussion Prompts

(Before, after or during activity)

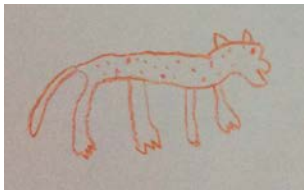
- Why are trees important to rivers? What do they bring to rivers?
- How many different species of trees are here?
- What might happen to the river if there were no trees?

Animals

A dominate theme in student responses was animals. Students said that they like animals and want to learn more about them. Some students said they are interested in learning about animals in their local environment, while others said they want to learn about animals both in their community and around the world. Some students said they were interested in learning about animals' habitats. Students said they wanted to learn about mammals, birds, reptiles, amphibians and insects.

Some community members also noted the importance of children learning about animals. When speaking about animals, most community members said that children should learn about native animals in the area. One community member said this knowledge is particularly important for children because there is great biodiversity in the corridor, which few people are aware of. A few community members spoke about the importance about learning specifically about birds because of the significance of birds to the area highlighted by Alexander Skutch and his work in the corridor. Another community member emphasized that animals could be a way to spark a child's interest in learning about the environment.

Mammals



Students listed many mammals that they were interested in learning about from their local environment including monkeys, rabbits, pumas, cats, and deer. Students also mentioned farm animals including cows, horses, and goats. Students expressed an interest in learning about animals from all around the world, such as elephants, lions, giraffes, and tigers.

Reptiles and amphibians

Children expressed interest in learning about reptiles and amphibians including snakes, anacondas, cobras, lizards, crocodiles, and turtles.

Fish

Some children expressed their interest in learning about fish. When drawing rivers, some drawings included fish.

"I like to see the birds and listen to their songs on my way home." - *Student*

Insects and other small creatures

Students expressed interest in learning about a variety of small creatures in their environment including bees, spiders, caterpillars, and ladybugs. Butterflies were especially popular, sometimes drawn as part of a backdrop, and sometimes drawn visiting flowers. Interestingly, although many children spoke about their interest in learning about insects, adults rarely mentioned insects.

Birds

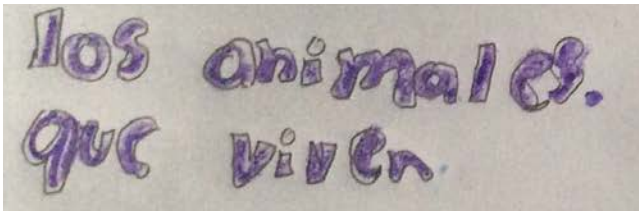
Many children said that they like birds and want to learn more about birds. A few children spoke about wanting to learn about the different species of birds. Children drew birds flying in the sky, in trees, in nests, and sometimes with eggs. One student said they like to hear the sounds of birds. Community members and students noted the importance of trees for birds.

Habitat Build

Goal	To investigate local animal habitats.
Materials	Natural found materials
Location	Outdoor

Instructions:

1) Open activity by introducing the animals/insects the groups would like to focus on.
2) Discuss the type of habitat and home those species live in, you may want to include pictures.
3) Divide the group into smaller groups of about three to four people and explain that each group will build a habitat/home for those animals.
4) Encourage the groups to first discuss what their animal habitat/home will look like based on the needs of the animal of choice and what they know about the animal. Groups can then begin building.
5) Explain that they can use natural materials and any additional materials you have made available.



Modifications & Extensions

- If you do not have access to an outdoor space, you can bring the outdoors in by bringing sticks, leaves, and other natural materials inside.
- Challenge groups to research an animal/insect/bird before building their habitat.

Discussion Prompts

(Before, after or during activity)

- What does this animal's habitat look like?
- What might this animal need in the habitat/home to survive?
- Could other animals/insects live near this animal? Is there a place for them in this habitat/home?

Oh Deer

Goal	To investigate the survival needs of local animals and human impact on animal life.
Materials	None ☺
Location	Outdoor/indoor

Instructions:

1) Divide the group in half. The two group will make two parallel lines, with their backs turned to the other group, with about 10-20 yards between them.
2) In this game one group represents the deer and the other group represents the resources. Deer need three resources to survive: food, water, and shelter. In this game the deer are looking for a resource, while the resources wait for the deer find them.
3) Each person on the deer and resource team will pick one resource (food, water, or shelter) and represent it with a hand action. For shelter, the participant will make a roof shape above their head. For food, they will place their hands on their stomach. For water, they will place their hands in front of their mouth.
4) After secretly choosing their resource (with the groups backs turned to one another), the leader will say 'GO!' and all the deer and resources will turn to face one another. The deer have to find a match in order to get their resource. For example, a deer who is looking for water (shown by covering their mouth) will look for a resource making the same water action. The deer will run and stand beside the resource that matches their action. If the deer finds a matching resource, they survived and continue to the next round. If a deer does not find their resource, they are dead and out of the game. Resources not taken by deer remain resources.
5) The leader should take note of number of deer and resources at the beginning and end of each round. Continue to repeat the game, with deer and resources choosing new actions.

Modifications & Extensions

Without the deer's knowledge, tell the resources that there has been a major human event or natural disaster that impacts the availability of a resource and in that round no resource can choose a particular resource (e.g., severe pollution so there is no more drinking water).

Discussion Prompts

(Before, after or during activity)

- What other factors could impact the availability of food, shelter, or water for deer?
- What other resources do deer need to survive?

Puma Paca

Goal	To investigate predator-prey animal relationships.
Materials	Small light object (e.g., water bottle), blind fold
Location	Outdoor/indoor

Instructions:

1) Participants in this game will have the opportunity to be the predator (the puma) or the prey (the paca). The object of the game is for the puma to successfully hunt the paca by grabbing the object from the paca without the paca hearing. The paca will be blindfolded.
2) The group will make a large circle.
3) Choose one participant to be the paca. The paca will sit in the middle of the circle with the blindfold on.
4) Once the blind fold is on the leader will place the object near the paca.
5) The group will chant "Puma paca, puma paca, puma paca, GO!" When the group says "go" the leader will point to one person to be the puma.
6) The puma then has to sneak up to the paca, take the object and return to their place in the circle without the paca hearing.
7) If the paca hears something they can point in that direction. They only get 3 chances to point.
8) If the paca successfully points in the direction of the puma then the puma loses the hunt.
9) If the puma successfully returns to the spot with the object without the paca pointing at them, then the puma won the hunt.
10) Continue to play the game until all players had a chance to be either the puma or paca.

Modifications & Extensions

Add to the game to highlight other characteristics of the animals. For example, if the animals is known to leap or jump at it's prey, place a tape line around the prey that the predator must leap from to get the object.

Discussion Prompts

(Before, after or during activity)

- What other strategies might a puma use to catch a paca?
- What strategies might a paca use to avoid being caught by a puma?
- What other predator-prey relationships exist in our forests?

The Butterfly Dance

Goal	To investigate the habitats local insects and human impact on insect habitat.
Materials	Hula hoops or ropes, printed images of plants/trees/flowers that butterflies frequent, music. You will need one hula hoop for every 2-3 players.
Location	Outdoor

Instructions:

1) Put the hula hoops (or material of choice) around the play area and place the printed images of the trees, plants, or flowers on each hoop. Invite the group to walk around and examine each plant.
2) Players in the group represent butterflies. When the music plays, the butterflies will dance and fly around and between the local plants. When the music stops, the leader will say either 'pollenating time' or 'resting time' and butterflies need to run find a spot on a plant. Depending on numbers in your group, put appropriate limits on each plant (e.g., only 2 butterflies allowed at 1 plant).
3) After the first couple rounds announce that there is a building development beginning and some of the butterflies' natural habitat has been destroyed. Remove 1-3 hoops from the game. Some butterflies will no longer have a space to pollenate or rest. These butterflies have died and are out of the game.
4) Continue to play and remove plants. Other events that may result in habitat loss include: toxic pesticides that have be sprayed in the area, drought, and/or pollution.
5) You can also add plant spaces. Some events may include: Government protection of natural spaces, picking up litter, reforestation after development, etc.

Modifications & Extensions

This game can be modified to discuss any insect or animal habitat.

Discussion Prompts

(Before, after or during activity)

- What other events might impact the habitat of local animals and insects?
- How can we help to protect the habitat of butterflies and other insects?

Metamorphosis Rock, Paper, Scissors

Goal	To investigate the stages of metamorphosis in frogs and butterflies.
Materials	None ☺
Location	Outdoor/indoor

Instructions:

1) This activity uses the game Rock, Paper, Scissors. In Rock, Paper, Scissors, a hand action is chosen to represent rock (a fist), paper (a flat hand) and scissors (index and middle finger making a cutting motion). In pairs, players choose one of the three hand actions at random and the winner is determined based on the following rules: rock beats scissors, scissors beats paper, and paper beats rock.
2) In this activity players will use Rock, Paper, Scissors to move through the metamorphosis stages. The frog metamorphosis stages, for example, are represented through the following actions:

> **Egg** - crouched down on ground
> **Tadpole** - standing with arms at side and wiggling
> **Froglet** - crouched down hopping with arms bent by side.
> **Frog**- Crouched, hands down hopping

3) Each player will start as an egg. They will find another egg and play Rock, Paper, Scissors. The winner of the game morphs into the next phase (tadpole) and the loser stays an egg.
4) You can only play another person who is in the same stage as yourself. The tadpole must find another tadpole to play against in order to advance to a froglet, and the egg must find another egg to play.
5) The first player to reach the final stage wins.

Modifications & Extensions

This activity can be used for any animal/insect that goes through metamorphosis. For example, the stages of a butterfly would be:
Egg - crouched down on ground
Larva (Caterpillar) - Standing with arms at side and wiggling
Pupa (Chrysalis) - Standing with arms crossed and not wiggling
Adult (Butterfly) - Flapping wings

Camoflauge

Goal	To investigate bird predator-prey relationship.
Materials	None ☺
Location	Outdoor, forested area works best, somewhere with lots of places to hide.

Instructions:

1) In this activity one player will be the laughing falcon (*halcón guaco*) and everyone else in the group will be mice, the laughing falcon's prey.
2) The falcon will stand in one place, close their eyes, call 'count down' and count down from 30. All the mice have a chance find a hiding place. Set boundaries for the group.
3) After counting down from 30, the falcon can open their eyes but cannot walk to find their prey. From where the falcon is standing, they can only turn their body. If they spot a mouse, they can describe what they see, for example, "I see a person in pink hiding behind that tree." If a mouse is spotted, they are out of the game.
4) To help find mice, the falcon can do three things throughout the game
    a. Call 'feeding time.' In feeding time, the falcon reaches their hands out so that their palms are faced upwards and counts down from 25. The mice must run from their hiding spots, touch the falcon's hands, and find a new hiding spot before the time is up. Every time 'feeding time' is called, the countdown number reduces by 5.
    b. Call 'numbers.' In numbers, the falcon holds up a number using their hands. The mice must try to see the number without being spotted by the bird. The falcon chooses one number for the whole game. The falcon eyes can remain open while holding up the number.
    c. Call 'switch.' In switch, the falcon closes their eyes while counting down from 10. The mice have 10 seconds to find a new hiding spot.
5) The game ends when only 1 mouse remains. The remaining mouse must know the number the falcon was holding up to win the game.

Discussion Prompts

(Before, after or during activity)

- Why might a mouse need to see it's predator while hiding?
- What strategies did you use to stay hidden in the game? What strategies might a mouse use in the forest?
- What strategies did you use to find mice in the game? What strategies might a laughing falcon use in the forest?

Waste

Waste was expressed by community members as a continued concern in the corridor. Many members shared their awareness of the negative impacts garbage has on the environment and the need for more community education regarding waste and recycling practices. Students also spoke about the negative effects of garbage and expressed their interests to learn better practices. Community members shared stories of progress in relation to garbage practices in the community and noted the importance of these practices continuing.

Littering

Many community members spoke about the importance of educating students about garbage and littering in hopes to instill positive habits and encourage change. In addition to education regarding proper garbage disposal, community members also expressed the need for community adults to model behaviour by picking up trash on the streets when they see it. A final concern addressed by community members was the lack of garbage disposals throughout the community. One community group suggested educating students around consumption and healthy eating to encourage a reduction in waste creation.

> "For if we teach them well, they will be straight trees. They will not be twisted because they will take care. If they see someone throwing trash… they are going to protect nature."
> – *Community member*

Recycling and garbage separation

The topic of waste education was closely connected with topic of recycling education. People in the community shared their efforts and interest in beginning large scale recycling programs in the corridor as they are aware of the importance of recycling for the environment. They expressed the need for recycling to be taught to children in many different ways, one being through the use of recycled art activities.

Students also shared their awareness on the need to keep the environment clean with one child specifically stating their interests in learning "what to put in the garbage."

In addition to educating about recycling practices for students and the community, some community members also shared the need for more municipal support as they reflected on some current challenges with garbage truck collections.

Recycle Relay

Goal	To practice garbage separation.
Materials	2 large unmarked bins, 2 garbage bins, 2 recycling bins, 2 compost bins, garbage waste, recycled materials, compost waste
Location	Outdoor/Indoor

"It is very important that [students] know that the trash must be separated. This is very important."
– Community member

Instructions:

1) Find an open space which will allow for a race to take place.
2) Fill the 2 unmarked large bins with garbage, recycling and compost waste
3) Place the 2 unmarked bins on one side with the 3 other bins (garbage, compost, and recycling) on the other side of the playing field with enough space to run between bins.
4) Divide the group into 2 groups.
5) Each group lines up behind the unmarked waste bins.
6) One at a time, one team member will choose a waste item from the unmarked bin and run to the opposite side and place the waste item into the correct disposal bin. Then, the team member will run back to the starting point and sit at the back of the line.
7) At the end of each race the leader will review the items placed in each bin and determine which group had the most correctly placed items.

Modifications & Extensions

To simplify, make a circle with the group and place the 3 bins (garbage, compost and recycling) in the middle. One at a time have a participant choose 1 item out of the unmarked bin and have them place it into the correct bin.

Discussion Prompts

(Before, after or during activity)

- Why do we sort garbage?
- What happens to compost?
- How can we encourage more people to recycle and compost?

After the Garbage Bin

Goal	To compare biodegradable and non-biodegradable products.
Materials	Recycled plastic bottles, dirt/soil, garbage waste, food waste
Location	Outdoor/indoor

Instructions:

Before implementing this activity ask the group to bring in recycled bottles. Clear bottles work best.

1) Make groups of 3-4.
2) Each group will get 2 clear plastic bottles.
3) Remove any plastic or paper around the bottle to ensure you can see into the bottle.
4) Cut the top 1/4th of the bottle, about 3 inches from the top.
5) Place dirt/soil into both the bottles. You can choose to have the dirt already collected or ask the group to go outside and collect dirt.
6) Next place garbage waste inside one bottle and the food waste in the other, place the top back on and seal it with clear tape.
7) Ask groups to make predictions about what will happen to the food and what will happen to the garbage.
8) Over the next 3 weeks continue to observe, record, and discuss.

Modifications & Extensions

- Groups can track what happens in the bottles over time in a notebook.
- Make a sequencing book. Take pictures of the preparation and while the contents of the bottle change. Put the pictures together to create a book.

Discussion Prompts

(Before, after or during activity)

- Where does garbage go after we put it in the trash can?
- What is happening to the food scraps in the bottle?
- What is the difference between organic and non-organic waste?

Community Clean Up

Goal	To take action against pollution and take part in environmental stewardship.
Materials	Gloves, garbage bags, recycling bags
Location	Outdoor/indoor

"We have to instill the idea that we do not dirty the city or the road."
– Community member

"Speak about picking up trash in the streets. They tell the kids "careful, child, do not throw the candy wrap on the street." – *Community member*

Instructions:

1) Explain to the group that you will be going on a walk to collect trash.
2) Divide your group into small groups of 3-4.
3) Remind the group not to touch anything hazardous such as sharp objects, broken glass, needles etc. Remind the group that if they are unsure of the item they should call an adult.
4) Walk in the community to collect litter.
5) After the walk review the amount of garbage collected.
6) Dispose garbage in appropriate bins.
7) Community clean up can be an event where community members are invited to participate. Participants can make signs to advertise.

Modifications & Extensions

- Create a cleaning schedule where you pick up litter once every week, month, or year.
- Track and compare how much garbage you collect at each community clean up event.

Discussion Prompts

(Before, after or during activity)

- What impact does litter have on our community? Humans? Animals? Plants?
- How can we encourage others not to litter?
- Why should we sort our garbage?

Recycled Art

Goal	To encourage reusing practices and reduce waste.
Materials	Bottles or cans, soap, water, sand paper, rubbing alcohol, paint, sponges, tissue paper, ribbon
Location	Outdoor/Indoor

Instructions:

1) Collect glass bottles or cans.
2) Wash the bottles with soap and water.
3) Use sand paper to rub off the paper and glue around the bottles.
4) Rinse with water.
5) Use rubbing alcohol and a cloth to continue to remove and smoothen the bottles surface.
6) Begin to decorate: Apply a base coat of paint using a sponge. Put in sun to dry and then decorate and design.
   a. Using recycled napkins or tissue paper you can cut out designs and pictures that you may want to put on your bottle. Use a paintbrush to apply clear glue where you want to place the picture, place the picture on the bottle and then apply a layer of clear glue on top to seal the picture to the bottle.
   b. Use other recycled materials to decorate such as beads, left over ribbon, etc.
7) After completion, the bottles and cans have many uses. They can be used to hold candle sticks, flowers, as a decorative stationary holder, given as a gift or simple as a decorative piece in your home.

Modifications & Extensions

- If working with a younger group, you may want to prepare the bottles beforehand.
- You can use the recycled art projects for fundraising, and inspire others to recycle.

Discussion Prompts

(Before, after or during activity)

- List all possible ways the cans and bottles can be reused
- What other items can be reused in our school? Home? Community?

Recycled Paper

Goal	To investigate the process of recycling paper products and to reduce paper waste.
Materials	Scrap paper, bowl, water, blender, old aluminum tray (with holes poked throughout), flat tray or surface, towels
Location	Outdoor/indoor

"There is the famous triangle, reuse, reduce, recycle. You must push that into their minds that must be in their minds."
– Community member

Instructions:

Before beginning this activity you may want to create a scrap-paper bin.

1) Gather scrap papers. *(No plastic paper. Drawing, printmaking, water colour and newspapers are best, however you can also use junk mail, office paper, or paper grocery bags.)*
2) Tear the scrap paper into small pieces and place into a bowl.
3) Add water to the bowl.
4) Using your hands, squish the paper and water together. If possible let the paper soak for a few hours.
5) Slowly pour some of the paper and water mixture into a blender.
6) Blend until it becomes a pulp.
7) Place a towel on the table with the aluminum tray on top. Then pour the pulp mixture into the aluminum tray. Make sure there is an even, thick layer.
8) Next, place a towel on top of the mixture and press down to absorb extra water. You may need to repeat this step until most water is absorbed.
9) Once most of the water is absorbed, flip the rectangle aluminum tray over onto the flat tray to let it dry.
10) Let dry for a few hours, once it is dry you can remove and re-use the paper.

Modifications & Extensions

Seed balls: After pouring pulp into aluminum tray, sprinkle native wild flower seeds on top. Then grab handfuls of pulp and seed mixture and use hands to form into balls and set to dry. Plant seed balls.

Discussion Prompts

(Before, after or during activity)

- Where does paper come from?
- How is it made?
- How is paper recycled?
- Why is it important to recycle paper?

Agriculture

"The children are watching and having more sensitivity as they sow. More touch and feel more contact with nature and defend it. Because from there up is the future. We have to start with them" - *Community member*

Community members spoke about the importance of learning about agriculture in both a community and global context. Although many families in the community own or work on farms, they shared that there is not as much education in the community and schools around agriculture as there has been the past. In addition, some community members raised concerns about how knowledge held by community parents and grandparents about agriculture, and producing and consuming organic, natural, local food is not being passed down to today's children. However, other community members noted some changing perspectives and practices in the community, such as families beginning to grow and produce their own natural, sustainable, organic food in their homes, for their own consumption. From a global perspective, community members talked about the commercialization and globalization of agriculture that is leading to a loss of knowledge about agriculture with young people around the world, pointing to the need for education about agriculture at a global level. However, a few community members also noted that there has been a more recent resurgence of global interest in medicinal plants and organic food.

Agriculture and Health

Community members spoke about the importance of children learning about "developing agriculture in a way that will result in healthy food," even if children will not be farmers. One community member said that learning about agriculture should begin with learning how to grow your own food. Community members also spoke about the importance of soil conservation, growing food without chemical additives, growing food in ways that have low environmental impact, and using alternative methods of pest control that do not hurt plants or animals. Community members talked about the health benefits of eating foods that are organic and free of chemicals, explaining that natural, organic food contributes to an increase in the quality of life for all.

Opportunities to Farm

Community members spoke about the importance of students having hands-on opportunities to plant and grow food. A few community members recalled having an agriculture class in their schools when they were children. In these classes, they were taught "that from a tiny seed came a cabbage, a radish, [and] what to do with all that, how to handle the water, the soil." Community members said that hands-on experiences like these are important for children so that "it somehow permeates" and becomes a lifelong understanding how food grows.

"Knowledge that the old people have is going to stop with us. Young people have some knowledge, but not agricultural knowledge. That knowledge will disappear. Well, and in fact it's already disappearing. Agriculture, now in these moments" - *Community member*

Herb Garden

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Goal	To explore and practice how to grow food and keep a garden healthy and productive.
Materials	Trowels, large shovels, watering cans, gardening gloves, garden scissors, flower pots, sturdy sticks (garden poles: supports for plants), string
Location	Outdoor/indoor

Instructions:

The garden can be a large, in-ground plot if there is available outdoor space, a built raised garden bed, or it can consist of a variety of individual planters (i.e., flower pots). There are many items you can reuse to plant in, such as plastic containers, car tires, glass containers, wood boxes etc.

Herb Garden:

1) This can be done indoors or outdoors. If outdoors, mark off a designated spot for growing herbs with rock or sticks. If indoors find a space with sunlight.
2) The group can choose some of their favorite herbs.
3) Create list of different uses of these herbs.
4) Together map out the location of planting.
5) Plant herbs. This can be done with seedlings or seeds. If beginning with seeds, germinate seeds before transferring to the garden (see activity *Planting Plants and Trees* for more information on germination).
6) Harvest herbs.

"Something very important is organic farming, that the child learns by developing that field. If they are not going to be farmers, at least these places will try to start developing that agricultural way to have healthy food."
– Community member

Modifications & Extensions

Ongoing gardening responsibilities: Regular watering, weeding, observations for insects and animals (some are good and seeing them is a sign of a healthy garden, some can be harmful).

Discussion Prompts

(Before, after or during activity)

- What do plants need to grow?
- Discuss how all plants require the same elements to grow, however differ in the amount they receive.

Soil Experiment

With inspiration from: U.S. Geological Survey (2011)

Goal	To investigate different types of soil.
Materials	Clear bottles, trowels, dirt from 3 different locations, notebooks and pens
Location	Outdoor/indoor

Instructions:

1) Separately label the 3 bottles 'Location A', 'Location B' and 'Location C'.
2) Collect dirt from 3 different locations, filling each bottle with about 1/3 dirt from each location. For example, bottle with "Location A" will only have dirt collected from location A.
3) Add water to each bottle, leaving only half an inch of space for air. Seal the bottles and shake thoroughly.
4) Allow the content to settle overnight, if possible.
5) Look at the bottle and have the group record their observations.
6) The dirt contents should have separated and fallen in the following order from the bottom of the bottle to the top: rocks/gravel at the bottom, followed by sand, silt, clay, and organic materials at the top.
7) Use this process and the chart below to find healthy soil for planting. The healthiest soil will have all four contents. This soil is good for planting.

Sand	Does not hold water.
Silt	Holds more water than sand, but does not hold nutrients.
Clay	Holds water and nutrients, doesn't allow much air to pass.
Organic matter	Provides nutrients.

Modifications & Extensions

Return to the original three soil locations and observe and record the plants, trees, insects, and animals tracks in that areas. Compare similarities and differences in all three findings to discover which species thrive in each area.

Discussion Prompts

(Before, after or during activity)

- What are the particles that make up dirt?
- Can dirt be 'unhealthy'? Why or why not?

Farm Visit

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Goal	To investigate best practices in farming through visiting different farms in the community.
Materials	Notebook, writing utensils, camera
Location	Outdoor/Indoor

Instructions:

1) With the group begin to reach out to local community members, organizations, etc.
2) Prior to visiting the location, provide some background information for your group about where you are going.
3) Brainstorm questions for the farm with the group.
4) While visiting the farm, encourage the group to actively ask questions, makes notes, and document observations.
5) After visiting the farm have a discussion with the group about what new information they have learned and begin to compare similarities and differences amongst the different farms visited.

Modifications & Extensions

With the group you can create a chart, graph or documentation book to compare practices at farms.

Discussion Prompts

(Before, after or during activity)

- What kind of foods does the farm grow?
- How does the farm deal with 'pests'?
- What are some challenges farmers face?

Mini Compost

With inspiration from: Changeworks (2015)

Goal	To investigate how decomposition happens.
Materials	A 2 liter clear plastic bottle, food scraps, leaves and small twigs, scissors, fertilizer, soil, waste, tape, plastic wrap, newspaper pieces
Location	Outdoor/indoor

"The most appropriate way for a child to learn organic agriculture has to be the care of biodiversity is the practice. Learn and use the tools."
- *Community member*

Instructions:

1) Cut the 2 liter bottle about 1/4th of the way down the top of the bottle. Do not cut all the way around the bottle so that there is a hinge to open and close the bottle.
2) At the bottom of the bottle place 2-3 cm of soil and moisten with a bit of water. On top of the soil place 2-3 cm of food scraps, followed by a thin layer of soil, a table spoon of fertilizer, and a layer of leaves, sticks, and newspaper pieces.
3) Repeat the layers until it is nearly at the cut in the bottle. Make sure the final layer is a sprinkle of soil and fertilizer. Spray with water.
4) Seal the cut in the bottle with tape and plastic wrap.
5) Place the bottle in a location with sunlight.
6) If there is moisture condensing on the sides of the bottles, open the top and allow the bottle to dry out. If it looks too dry, add some water.
7) Mix the contents in the bottle daily.
8) It may take 1 or more months for the soil to be ready for use.

Modifications & Extensions

Use the soil made by placing it in your gardens to help grow more food.

Discussion Prompts

(Before, after or during activity)

- How long do you think it will take for the contents to become soil? Why?
- How does food decompose?
- What might have made this decomposition process faster or slower?

Re-Growing Food Scraps

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Goal	To limit food waste and explore different ways to produce food.
Materials	Jars or glass container, soil, pots or garden space
Location	Outdoor/indoor

"That is, creating awareness in the people that if we can sow and consume our own organic food, we can have a better quality of life without spoiling nature, but rather taking advantage of what we have around."
- *Community member*

Instructions:

Many vegetables can be re-grown, although some are a little more challenging than others. Start with some easy vegetables and herbs such as green onions and then challenge the group to re-grow other vegetables, herbs and even some fruits. All can be grown by harvesting seeds.

Romain Lettuce

1) Chop the lettuce and leave about 5cm from the bottom.
2) Place the lettuce in a glass container with a little bit of water.
3) Leave for about 5-7 days then transfer into pot with soil.

Celery

1) Chop celery leaving about 5 cm from the bottom.
2) Place the celery in a glass container with a little of water.
3) Leave for about 5-7 days.
4) Transfer into pot with soil.

Red/white onion

1) Cut onion in half. Save the half with the roots and use the other half for cooking. Cut off 4 sides around the root to make a square.
2) Re-use an object, such as a coffee tin. Fill the tin soil and burry the onion close to the top.
3) Place in a sunny area.

Green onion

1) Chop green onion and leave about 5cm from the bottom.
2) Place in jar with little water and leave for about 5-7 days.
3) Transfer into pot with soil.

Modifications & Extensions

Sequence book: Record the process by taking photos or drawing and use as a tool to educate others.

Discussion Prompts

(Before, after or during activity)

- Where does our food waste go when we do not eat it?
- How can we reduce our food waste?
- What do vegetables and fruit need to grow?

Interconnectedness

Both community members and students spoke about the interconnectedness of diverse aspects of the environment – how humans, animals, insects, trees, flowers and weather are all intertwined and impact one another. A few community members spoke about the importance of "creating consciousness among children" about the interconnectedness of flora, fauna, and humans.

Wildlife, trees and forests

Many community members talked about the intricate relationship between wildlife and forests. Community members spoke about the connection between trees and animals and the importance of reforestation to encourage wildlife to return to the forests. A few community members spoke about personal experiences in deforestation and reforestation. One community member said that when trees were cut on their land, all the birds left. As another community member explains, deforestation and pollution leads to the "exodus of fauna" because "there are no trees, no food, no shade, no place to sleep. There is nothing." Many community members spoke about the importance of planting trees for wildlife. One community member explained that after replanting on her land 25 years ago, there is now a variety of fauna returning to their land. Another community member explained that it is important for children to understand the role of herbivores and carnivores, and that "if we eliminate certain herbivores, we are eliminating other species." One community member spoke about the local importance of corridor connectivity and forested areas in the corridor. Within the ASBC, this community member explained that more trees and forested connections between the Las Nubes forest and Los Cusingos are needed. Forested areas throughout towns and farms in the corridor can act as 'bridges' to allow animals to move between the conservation areas. Students demonstrated that they understand the importance of forests and the natural environment for animals. Students said that flowers, trees, and water are important to the lives animals and insects.

Humans and the environment: Conservation and Protection

Community members spoke about human's role in caring for and protecting the environment. Community members recognize that many students are aware of the need to care for the environment. This was reflected in student responses, where students spoke about their interest in learning more about how to care for and protect the environment, including rivers, and animals. One student said they are interested in "how to care for trees so they won't get contaminated." Other students spoke about ways they work to care for the environment sharing statements like "do not cut down trees", "do not throw garbage in the river" and do "not harm the animals." A few community members also spoke about hunting in the community. Although hunting is illegal, it still occurs. Community members spoke about how children can help to protect the environment by reminding people that hunting is wrong, and that "they have the right to tell" someone if they see hunting happening. Community members noted the importance in providing children with the knowledge to conserve and care for the environment.

"Help them to forest again, [it's] very important for children to learn how to plant trees. Which trees are good for birds, which good trees are good for monkeys, lots of little monkeys. All animals need the environment, and children have to learn to help the environment so that all animals benefit from it." – *Community Member*

Small world exploration

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Goal	To explore interconnectedness within an ecosystem.
Materials	String, rulers, magnifying glasses
Location	Outdoor/indoor

"With games, we make small plots with a wick, we put fifty centimeters, a stick here, another here, we make up to a meter. We put a magnifying glass to see what is biotic and abiotic.… Dead leaves, dead branches, and how they feed on it. Children begin to search and find."
– Community member

Instructions:

1) Take the group out into an outdoor space.
2) In small groups of 2-3 (or individually), participants will choose any space within set boundaries. Encourage participants to find spaces far from one another.
3) Once they found their space they can use the string to mark off an investigation area. If string is not available, use rocks or sticks, anything to mark off the area. As the leader, you can choose the size the participants will explore. For example 15cm x 15cm, 20cm x 20cm, etc.
4) After marking off the designated space groups observe the area for about 10 minutes. Groups should make observations of different colours, shapes, plants, animals, insects, etc.
5) Groups can record their observations.
6) Bring the group together and discuss findings.

Modifications & Extensions

Repeat the activity in different locations, for example, beside a river and compare similarities and differences in findings. You can also repeat and make the investigation space larger.

Discussion Prompts

(Before, after or during activity)

- What living and non-living things did you find in your space?
- Where the things in your space connected in anyway? If so, how?

Nature Map

With inspiration from: Tracey, Kotulak, & Zubowicz (2010)

Goal	To explore the diversity of living things that make up an ecosystem.
Materials	Sticks
Location	Outdoor in a forested area

Instructions:

1) Put stone in the middle of the area you want to explore.
2) Ask each person to find two sticks, one stick longer than their arm and the second stick about half the size of their arm. Ask the group to make a circle.
3) Each person will place their long sticks on the ground, with one end touching the rock and one end pointing towards themselves. It will create a circle which is divided into small pieces like a pizza.
4) Each person will then place their small stick at the tip of the long stick horizontally, to create a triangle shape with the long stick next to theirs. A outside boarder around the circle will be made.
5) Each person will have one triangle in the circle.
6) Each person will turn around and walk away from the circle. After every few steps, each person will pick up one thing.
7) Allow the participants to take about 50 steps, or collect about 5 items.
8) The participants will return to the circle and place their items inside their triangle of the circle.
9) This will create a map of the typical plants, or characteristics of this area, with rocks, moss, leaves, seeds, pinecones, etc.

Modifications & Extensions

Play this activity in different settings and take pictures of the final nature maps. Then, compare the pictures to see how the ecosystems differ.

Discussion Prompts

(Before, after or during activity)

- Are there patterns in the items found? Similarities? Differences?
- How are the items found connected?
- How might the map look different in another area of our community? Of the country? Of the world?

Jenga

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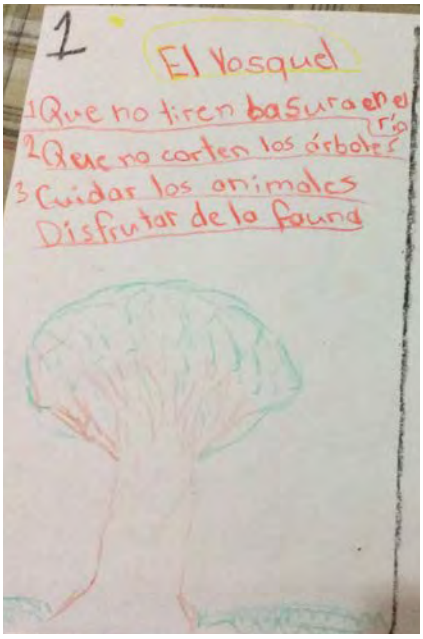
Goal	To investigate the ways in which human action can impact the environment.
Materials	Jenga, markers, paper, die/dice
Location	Outdoor/Indoor



Instructions:

1) Separate Jenga blocks into 4 equal groups and add a coloured dot to the ends of each block to represent different elements of the earth. Blue represents water, red represents air, brown represents land, and green represents living things.
2) Set up the Jenga game and disperse the colours throughout.
3) Players take turns rolling the die to indicate their move. Each number represents an environmental event.

1 = No change (blocks remain)
2 = Remove water (blue)
3 = Remove air (red)

4 = Remove land (brown)
5 = Remove living things (green)
6 = Positive change (add block)

4) Have each player think of an environmental event based on the colour they rolled. For example, if a 2 (remove water) is rolled, perhaps someone litter in the river. A blue coloured piece needs to be removed from the tower.
5) Continue until the blocks fall.

Discussion Prompts
(Before, after or during activity)

- What do the tower of blocks represent?
- What is an eco-system?
- What are some human actions that can impact ecosystems?
- What are some non-human events that can impact ecosystems?

Web of Life

Goal	To investigate the interconnectedness of animals, plants, and humans in ecosystems.
Materials	None ☺
Location	Outdoor/Indoor

Instructions:

1) Stand in a circle. Each player will choose an animal, plant, or other living thing that may be found in the local forest. Players can choose to be anything from a deer to a mushroom. Have players declare their chosen living thing to the group.
2) The leader chooses one player to stand in the centre of the circle. Choose someone who has chosen a living thing that can be connected to many other living things for example, a worm.
3) The leader will then ask the group, 'What is connected, in some way, to this worm? Does anything wat worms? What do worms eat?'
4) The leader will take one person from the group who is connected to the worm (e.g., a bird) and ask them to hold hands. The leader will ask the same questions about the bird, and choose someone who is connected to the bird (e.g., a tree) to hold the bird's hand.
5) As placing players in the middle of the circle, the leader should try to encourage players to cross over one another to hold hands, to create an interconnecting crisscross 'web.'
6) Once every player is placed in the web, the environmental events begin. The leader will say, for example, 'A human has sprayed harmful pesticides in the area and all the small insects have been hurt.' All the small plants will then have to release one of their hands from a partner. The leader continues to list events such as pollution, building developments, flooding, etc. With each event, one type of plant or animal is impacted.
7) If a player loses both of their connections to the web (i.e., both hands without a partner), they are out of the web.
8) Soon, there will be no animals/plants left in the web. Discuss the impact of human action on nature.

"There may be several methods, talking to them about the food chain. From what are herbivores, carnivores ... If we eliminate certain herbivores we are eliminating other species."
– Community member

Discussion Prompts

(Before, after or during activity)

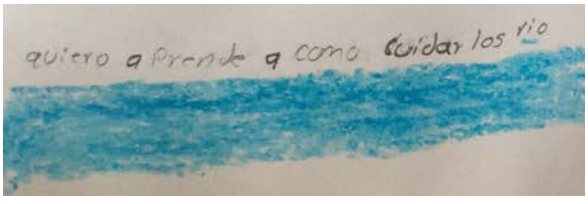
- Does human action impact plant and animal life? Is so, in what ways?
- What human action could have prevented or helped some of the events that happened in the game?

River Run

Goal	To investigate how human action in waterways can impact fish life.
Materials	None ☺
Location	Outdoor

Instructions:

1) The object of this game is for fish to get from one end of a river to the other end without being caught by obstacles. At one end is the starting line for fish and at the other is the finish line where they are free to live out their fish lives.
2) In an open outdoor space decide where the 'river' will be and determine the start and finish lines. Divide the group in half. One half of the group will be fish, the other half will be the obstacles.
3) Choose 3 players from the obstacles team to act as boulders in the river. They should spread out throughout the river, and sit.
4) In the first round, the fish must run to the finish line without the boulders touching them. The boulders cannot move but can use their arms to catch fish.
5) The surviving fish go back to the start line, the caught fish become obstacles.
6) In the next round, have some players from the obstacle team line up along the edges of the river way. These obstacles are now humans fishing. These players cannot go into the river area, but can reach with their arms to catch the fish. (In another round, you can put more obstacles on the sidelines to be large cats/animals preying on fish). Surviving fish continue, caught fish become obstacles.
7) Repeat rounds by adding obstacles. For example, add a couple of obstacle players in the river to act as 'litter.' The litter can move throughout the river. Or, add a dam by having obstacle players form a horizontal line to block half the starting point for the fish.
8) The last surviving fish wins. Discuss how the game became increasingly difficult for the fish.



Discussion Prompts

(Before, after or during activity)

- How can human action impact fish life?
- What other factors might impact the life of fish?
- How can we help keep rivers clean and safe for fish?

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Community-University Relations and Partnerships in the Alexander Skutch Biological Corridor

Community Voices and Recommendations

Findings Summary

Natalie Cummins, RECE, MES (Candidate) & Olivia Caravaggio, RECE, MES (Candidate)

Introduction

This findings summary is a part of a larger study called *Semilla: A community-university partnership for environmental education* that began in February 2017 with communities in The Alexander Skutch Biological Corridor [ASBC] in Costa Rica and graduate students from York University in Toronto, Canada. The project aims to understand the impact of a community engagement initiative on community-university relations. The community engagement initiative is a partnership between York University and the community to develop an environmental education resource. To identify changes in community-university relations, we investigate:

(1) Community members' perspectives of York University and community-university relations before participation in the development of the environmental education resource;
(2) Community members' perspectives of developing the environmental education resource;
(3) Community members' perspectives of York University and community-university relations after participation in the development of the environmental education resource.

This findings summary focuses on the first point (1). To explore community members' perspectives of York University and community-university relations before their participation in the development of an environmental education resource, we investigated what the community knew about York University, their past experiences with the university, and their perceptions on current and past community-university relations and partnerships. In asking about community-university relations, we focused on both the university generally and specifically about relations with graduate students, like ourselves. These conversations with the community additionally led to suggestions and recommendations from the community for York University, which are shared in this findings summary.

Context: York University in the ASBC

In April 2016, York University's Faculty of Environmental Studies opened an 'EcoCampus' in Costa Rica's ASBC to act as a centre for research and learning for students from York University and the larger international academic community. The ASBC is an area that was created in 2005 when seven communities came together to support the Tropical Science Center and the Las Nubes Biological Reserve[1,2]. The ASBC aims to increase biological connectivity along the Río Peñas Blancas between various conservation areas and parks that work for wildlife and environmental conservation including Los Cusingos Bird Sanctuary (at the southern end of the corridor), Las Nubes Biological Reserve, and Chirripó National Park (at the north-eastern end of the corridor) [1,2,3]. For decades prior to the opening of the EcoCampus, York University was present in the community through research, community partnerships, and offered courses in the ABSC for York University students. Additionally, La Casita Azul, an education and learning resource centre (known locally as the library), created by York University Libraries, opened in 2015 in the ASBC[4]. La Casita Azul offers the community, York University students and researchers access to internet, computers, printing, books and other resources as well as community workshops and programming.

Community-University Relations

Universities and academic institutions face pressure to engage and build partnerships with the communities in which they reside[5] due to expectations to share knowledge with communities in ways that are relevant and encourage social change[6, 7] and a sense of social responsibility to give back to the communities that universities work within[8,9]. Universities are expected to conduct research in ways that respect and include the communities they work with, moving towards best practices commonly associated with community-based and participatory action research [CBPAR]. CBPAR focuses on topics that are important to communities, works to impact and make change in community, and encourages collaboration and partnerships between researchers and community members in all aspects of the research process[10]. Research methods in CBPAR must allow for partnership building, reciprocity, empower and include participants, and ensure knowledge sharing happens between the community and the researchers[11,12,13,14].

Community engagement in university activities can lead to partnerships and knowledge sharing that benefit both the community and the university[15]. However, these partnerships can result in unbalanced power relations where the university holds

more power than communities because of their position[8,6] leading to the university benefitting more from the partnership than the community[16]. To address these power dynamics, past research suggests there be open dialogue and mutuality in the partnership, mutual gain for all parties involved, and opportunities for knowledge transfer between parties[7,8].

The Current Project

Participants

From March 17th, 2017 to April 22nd, 2017, 49 community members and school staff* from three communities in the ASBC participated in 10 interviews and 6 focus groups.

Methods

In semi-structured forty minute to hour and a half long focus groups and interviews, community members were asked about their current thoughts and perspectives about York University and community-university relations and partnerships.

All collected data were transcribed and translated. Collected data from focus groups and interviews were analyzed using grounded theory. Grounded theory works to ensure that the findings of a project come from the voices of its participants[17]. After reading transcripts to identify common themes, themes were organized into a list of thematic groups that was then used to re-read and organize transcripts into relevant groups. One theme group would then include everything each participant shared about a specific topic. Those voices are summarized here.

Community Voices: Project Findings

General Perceptions of York University

Some community members were aware of the presence of York University, the EcoCampus, and La Casita Azul in the community, while others were not.

- Most community members were aware of York University, while a few did not know about the university.
- Some community members were aware of the EcoCampus. There was some confusion surrounding the name of the EcoCampus. The EcoCampus was more commonly known in the community as York University.
- There was some confusion surrounding whether La Casita Azul was a part of York University and how the library worked with the university.

The community's definition of York University, including the university's activities in the ASBC, varied, with many explaining they know very little about the university.

- Many community members explained that they did not know what the purpose, goals, or general activities of York University was in the community and in what ways the university partners with the community.
- A few community members knew the university is from Toronto. One community member explained that York University has several different faculties in Toronto and that the faculty in the ASBC is Environmental Studies.
- Some community members described York University and the EcoCampus as places of research, describing them as a "research facility," and "an area of study." Other community members explained that the EcoCampus has lectures and classes.
- There are other Canadian groups that visit the ASBC regularly which are not affiliated with York University. York University was sometime confused with these groups in discussions.
- The community expressed a desire to know more about what the university does, what courses they offer, and what presentations and events are happening at the EcoCampus.

> "I do not have a clear idea of what [York University] is in itself, what it is for… what is required, what do we have to contribute or what they are going to contribute."– *Community member*

Community-University Relations and Partnerships

The community spoke about York University's presence in the community, with some noting the need for more connections with the community.

- A few community members spoke about the need for the university to have a greater presence in the community. One community member said "the presence of York does not exist, just the image of what they can invest with money", explaining that people from the university are not actually working with the community. Another community member said that York University needs more identity in the community and needs to do more work in the community.
- A few community members explained that the EcoCampus was made for community-university partnerships and that the university makes some efforts to have a relationship with the community, but also recognize a need for more connections.

*Please note: The term 'community members' in all sections that follow refers to and includes both community members and school staff who participated in the present project.

- One community member noted the need for more outreach from York University to all communities in the corridor, beyond Santa Elena and Quizarrá.

Community members spoke about the need for more open communication with York University

- Community members expressed difficulty with getting in direct contact with York University and confusion surrounding the roles of different university staff. Some community members said they did not know who to contact in regards to student research projects, partnerships with the university, and/or using the EcoCampus.
- Some community members spoke about how additional and improved communication is needed with York University.
- A few community members said that communication with the university was good in the past, but has decreased over time.
- A few community members described York University staff as "too busy" to talk with community residents.

Community Involvement with York University

Community members spoke of experiences in past and present partnerships and projects with York University.

- Some community members mentioned experiences working with York University in research either in research projects conducted by the university or in other projects partnered with the university.
- Some community members said they take part in the homestay program with the university and host students in their homes.
- The community spoke about their involvement in student research projects as project participants or in assisting graduate students in the corridor while they conducted their studies. Community members spoke about past graduate student research projects on topics of water and rivers, otters, tourism, environmental education, medicinal plants and agriculture.
- Some community members had no past or present involvement with York University.
- One community member said that York University seems to work with both the community and other Costa Rican universities.

Community perceptions of access to the EcoCampus were mixed.

- Some community members had attended events at the EcoCampus, such as the inauguration and an environmental education event. Other community members had been to the EcoCampus when working with a graduate student.
- Community members spoke about a day when a local school walked to the EcoCampus as part of a fitness challenge and had lunch there.
- One community member tried to plan a meeting at the EcoCampus, but found that residents were charged a fee. This community member thought that the Ecocampus was open to the community, free of charge. Another community member explained that there is a discounted fee for community residents to rent space in the EcoCampus.
- One community member said that there have not been many community events at the EcoCampus, while another community member estimated that the community uses the space around 5 times a year. Other community members said that the EcoCampus mostly hosts "private events". One community member said that the community is only invited to events at the EcoCampus "when it's convenient", when community members are needed.
- Some community members had not been to the EcoCampus. A few community members said that they had been invited to the EcoCampus, but had not yet visited.
- Community members expressed a desire for increased access to the EcoCampus.

The community is excited and interested in future involvement with York University.

- Many community members have a desire for more involvement with York University in the future.
- Some community members expressed interest in volunteering with students or in projects with the university.
- One community member said they would like to share what their groups do with the university and its students.
- One community member said they want to be involved in "everything" the university does, including events and lectures that happen at the EcoCampus.
- The community expressed a desire for York University students to visit more local entrepreneurs and farmers when they are on the semester abroad trip.

Knowledge Exchange

The community discussed knowledge transfer from the university to the community through research.

- Some community members spoke about how the university contributes to community knowledge about the local

environment through research and graduate student projects. A few community members spoke about how the university has encouraged residents to care for the environment.

- A few community members discussed how working with graduate students in the corridor increased their own knowledge of the university, their own communities, the local environment, and improved their English language skills.
- Some community members expressed a desire for more opportunities at the EcoCampus or with the university to learn about the local environment and ongoing York University projects, particularly for children and youth in the community.

> "What I think is that one day the kids who are here studying can go to York to… I do not know. To acquire knowledge there. Because I think that people only come from there to here and not the other way around."- *Community member*

Knowledge transfer from the community to the university was mentioned in reference to the cultural exchange that happens in homestays.

- Some community members spoke about the cultural knowledge exchange that occurs in homestays, where the community learns more about Canadian culture and Canadian students learn more about Costa Rican culture.
- Community members expressed a desire to share more about local community groups and the ASBC with York University students.

A few community members spoke about knowledge transfer that happens within the community.

- A few community members spoke about knowledge exchange that has happened within the community through connections that have been facilitated by York University. For example, one community member discussed how a graduate student project linked a local community group with schools to give talks about the environment.

Two-way knowledge exchange was highlighted as important by a few community members.

- A few community members spoke about how it is important that there are opportunities for two-way knowledge exchange, with knowledge transfer from the university to the community and the community to the university.

Student Knowledge of the ASBC and Local Communities

The community expressed a need for more information about the ASBC and local communities to be shared with York University students prior to their arrival.

- Some community members spoke about the need for graduate students to know more about the different community groups and the community itself prior to student conducting research in the ASBC.
- Community members expressed a need for graduate students conducting research to connect and consult with the community prior to arriving in the ASBC to understand current problems and needs of the community. A few community members discussed the importance of students taking on projects that are relevant and important to the community.
- A few community members spoke about a need for graduate students conducting research to know what research has already been done in the community, specifically when students are focusing on topics that have already been considered in other projects. Rather than repeating research projects, which has happened in the past, students should build from past projects or begin new relevant projects.
- Prior to students taking part in the semester abroad program, more information about the ASBC, its communities, and Costa Rican culture should be shared with students.

The Need for Relevant Research Projects and Knowledge Mobilization

Knowledge mobilization is the phase of research when researchers share their findings with the communities in which they work.

- Some community members noted the need for students to share their findings with the community more often. A few community members spoke about how students in the past would "take all the information," "leaving nothing here" and not return or share the information with the community, however, one community member recognized that this is now changing.
- A few community members discussed the need for research projects that make change and address existing community issues/topics.
- One community member discussed the role York University can play in building research capacity in the community, explaining that the community has the information and the environment, but the university has the ways to "find the information" and should teach the community "how to use it."

- Another community member spoke about the need for research to involve more communities in the ASBC, beyond Santa Elena and Quizarrá.

> There is a need "for the research to actually improve or govern something… not only for a student to come and say 'I did my research in Costa Rica, I counted 200 very nice little toads and here it is and here I did it." - *Community member*

Community Perspectives on the Benefits of York University's Presence in the Community

The presence of York University in the community was most often viewed as an economic benefit.

- Community members spoke about how York University increases tourism and family income with students who pay for homestays in the semester abroad program and during graduate student research projects.
- Community members noted that York University has brought jobs to the community, giving residents the opportunity to work in their local community.

Some community members said that York University impacts the environment and environmental practices in the community.

- These community members spoke about how York University makes contributions to conservation and conducts important environmental research, contributing to the overall "preservation" of the ASBC.
- One community member explained that the presence of York University and the EcoCampus impacts resident environmental practices and behaviours, explaining that with the university's presence residents feel more "pressure" "to take care of the environment, the water" and to stop hunting.
- This community member also explained that graduate student research in the ASBC can impact resident environmental behaviours, providing an example of a community member who after taking part in an interview with a student stopped burning and deforestation practices on their land, and is now an advocate for environmentally responsible agriculture.

A few community members viewed knowledge exchange between the university and the community as a benefit.

- Some of these community members said that through working with past graduate students the community has learned more about their local environment, important environmentally-conscious practices such as "not to litter [and] not to burn" garbage, tourism attractions in the area, and more about their local community.
- Some community members said that students who come learn about the local environment and the community culture.

A few community members spoke about the specific benefits of La Casita Azul in the community.

- One community member explained that through offering workshops and courses on a variety of topics to all communities in the ASBC, La Casita Azul has successfully brought together residents from different communities who may not have historically participated in programs together.
- Other community members spoke about La Casita Azul bringing increased community access to information and information-sharing resources such as computers and books.

A Summary of Recommendations from the Community

IMPROVE COMMUNICATION

- *Share more information with the community* about the EcoCampus, York University and La Casita Azul.
- *Improve communication with the community.* Clarify who to contact about different university activities and be more accessible and responsive.

INCREASE INVOLVEMENT

- *Increase access to the EcoCampus for community members* with more community events and activities.
- *Increase involvement in and partnerships with the community* within topics of the environment and beyond. For example, there is interest in partnering with York University to help fund instruments for school bands, to begin community-student Spanish-English conversational classes during the semester abroad program, to continue family programs at La Casita Azul, and to collaborate in environmental education in local schools and the community.
- *Offer more opportunities for local children and youth to be involved in education at York University*, to learn and see "everything that is being done up there" at the EcoCampus.
- *Continue to expand into other areas and communities in the ASBC*, in course work and in research.

INCREASE KNOWLEDGE EXCHANGE

- *Support York University semester abroad students* to learn more Spanish before arriving in the ASBC.

- *Provide students with more information about the ASBC*, local community groups, and Costa Rican culture before students arrive in the ASBC.
- *Students need to share their research with the community after completion.* The community expressed a desire to know not only about the projects happening in the corridor, but also the findings of those projects.

IMPROVE COORDINATION AND ORGANIZATION IN RESEARCH

- The community expressed the need for *more coordination and organization in research projects conducted in the ASBC* to avoid repeated projects and connect students with local community members relevant to project topics to make the projects more time efficient. Community members suggested having a designated student research coordinator both at York University and in the ASBC and a commission in the ASBC dedicated to coordinating student research.
- *Research projects should be relevant to the community, address community needs and result in positive impact for the community.* One community member explained that the Local Council of COBAS has defined topics of interests in the ASBC, and that students should consult with the council prior to beginning their work to ensure students take on projects that are relevant to the communities, and so the council can help to facilitate student-community connections for projects.

CONTINUE TO FOCUS ON THE ENVIRONMENT

- *Continue to support the local environment*, conservation and connectivity in the ASBC.

Conclusion

As York University continues to welcome Canadian students to its EcoCampus, and as the semester abroad program and research in the ASBC continues to grow, it is critically important that York University maintain a strong relationship with communities in the ASBC. Universities around the world are facing increasing pressure to make community engagement a priority, respect and include communities in university activities and research, and to go beyond education and research to include work that contributes to the quality of community life[5, 6, 9]. In the development of the EcoCampus and semester abroad programs, ongoing research and their existing partnerships in the ASBC, York University has expanded their community to include ASBC residents, becoming a notable presence and stakeholder in these communities.

This project aimed to explore current community perceptions of York University and community-university relations in order to evaluate the impact of a community-engagement initiative (the development of a community-based environmental education resource). In fulfilling the first phase of Semilla and discovering community perceptions of York University and community-university relations, we also heard the community's suggestions and recommendations for future relations with York University.

Community members are clearly eager to partner and work with York University as its presence in the ASBC continues to grow. We recognize that the community voices in this project offer a snapshot of community perceptions at a specific moment in time from a slice of the ASBC population. Still, these voices can help to carve the path for the future of York University, the EcoCampus and ASBC communities. The community voices summarized here call on York University to continue their efforts in the areas of community-university knowledge exchange, community-university communication, coordination in graduate student research projects, access to York University facilities, and community-university partnerships. It is the hope that the community voices summarized here can help to illuminate next steps for the university, the community and for the present project, Semilla.

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Knowledge Mobilization: Video of Research Process

Click the link below to view the video:

English: https://youtu.be/JA8o__dPSwk

Spanish: https://youtu.be/L4R1O2-SNPA