

Kindergarten Deforestation Experts: Interdisciplinary Learning for Understanding and Addressing Global Issues

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ABSTRACT

In our interconnected world, what does it mean to teach global environmental issues to young children? Using theoretical foundations from the social justice learning community and child-directed, inquiry-based learning best practices, this practitioner reflection details a seven-week, student-centered, interdisciplinary learning experience conducted in the author's classroom. This exploration of the Amazon rainforest and deforestation promoted content knowledge development across fine arts, math, earth science, English language arts, and social studies disciplines; standards-based skills acquisition; collaboration; self-determination; and critical engagement among students in a diverse kindergarten class at a public school in Los Angeles County, California, in the United States. To guide the development of the project, an appropriate social studies framework was utilized along with the popular culture resource "3 Questions That Can Change The World" from the Kid President enterprise. Students conducted research and took concrete action through a variety of projects, including raising and donating funds for injured wildlife and reporting on their experiences verbally, in writing, and graphically. I analyzed my field notes, reflective teacher journal, and student work samples to improve my practice and pedagogical progress in teaching young students about global environmental issues. In this process of critical reflection and action inspired by Freire's (1993) concept of praxis, I found that inquiry-based learning that encourages students to ask meaningful questions, investigate answers through interdisciplinary learning, and find meaningful solutions to the problems they encounter increases their self-determination.

Keywords: early childhood education, sustainability education, social justice education, global education, interdisciplinary learning

Theoretical Foundations and Teaching Context Connection

Social Justice Learning Community

Diaz and Flores (2001) argue that teachers often take on sociocultural mediator roles in addition to their traditional academic teaching roles. To be effective sociocultural mediators, teachers - especially those with students of color or other minoritized students - should be aware that students bring a wealth of experiences and personal, cultural, and community knowledge with them into the classroom. As such, teaching and learning is viewed as a mutual and collaborative endeavor between teacher and students, in which the teacher views the students as capable of creating, rather than only passively receiving, knowledge. The theoretical implications of Diaz and Flores' (2001) study of teacher as sociocultural mediator and guide greatly influenced my pedagogical approach and praxis (Freire, 1993) in planning and conducting this unit. I drew heavily from traditional critical pedagogy, which, as Duncan-Andrade and Morell (2008) remind us,

is an approach to education that is rooted in the existential experiences of marginalized peoples that is centered in a critique of structural, economic, and racial oppression; that is focused on

dialogue instead of a one-way transmission of knowledge; and that is structured to empower individuals and collectives as agents of social change (p. 1).

In positioning students as capable knowledge creators, I hoped to embrace the sociocultural mediator role in my pedagogical practice and help my students maximize their potential.

Additionally, in my positionality as an educator of color and an educator-activist-scholar (Suzuki & Mayoraga, 2014), I am committed to practicing critical reflexivity in pursuit of educational justice (Alim & Paris, 2014). As a social justice educator, my positionality and international teaching experiences have been critical in informing my philosophy of education, my teaching style, and in creating the kindergarten classroom community I have always envisioned: where students are a mutually supportive community of learners whose dreams, hopes, wishes, and interests are reflected in the curriculum. Peterson (2012b) asserts that curricula that reflect students' lives and encourage their engagement in meaningful dialogue, questioning, and problem solving, with an emphasis on critiquing biases and prejudice and activism for social justice can foster social justice learning communities. My aim was assisting participating students in meaningfully connecting what we were learning in the classroom with real-world issues that are global in scope. My classroom is a laboratory dedicated to creating a more just society, a laboratory where students can learn about global issues through interdisciplinary projects, questioning the way things are, and thinking critically about meaningful collaborative action we can take to effect change. To promote globally relevant education, I hope to assist my students in cultivating their critical consciousness (Ladson-Billings, 1995) by encouraging them to critique global and local issues and identify social inequities from a young age, which may prepare them for leadership roles.

Upon further reflection on my positionality, education philosophy, and teaching style, I realized that curriculum integration is one of my greatest strengths. Some of the most powerful teaching and learning occurs when students are inspired to think broadly across different disciplines and subjects and are offered opportunities for making practical connections in their learning. For example, in his work focusing on social justice mathematics, Peterson (2012a) suggests that when math is integrated with other subjects such as social studies, it can be used as a language and a tool for explaining the world and global issues and helping students understand social inequities. To that end, I planned a seven-week unit on deforestation in the Amazon rainforest that integrates social studies, earth science, visual arts, English language arts, writing, and math. My main imperatives, after addressing and understanding deforestation as an issue, was energizing students and inspiring them to take direct action to make a positive difference in their own communities and to realize that children, not just adults, are capable of making meaningful changes in this world,.

Global Education and Global Competence

One's global competence is a toolbox comprising sets of knowledge, skills, mindsets, and values needed to thrive in a diverse, globalized society. It can effectively equip students for college study and for careers in a globally connected economy (Asia Society & Longview Foundation, 2016) and foster individually and collectively responsible global citizens who try to make their local communities, countries, and world more just and sustainable for us all (Banks, 2014; Zhao, 2010). Global competence should not be an "add on" to curricula; rather, foundations in interdisciplinary knowledge should be integrated across curricula in all subjects throughout the school year (Mansilla & Jackson, 2011). In today's interconnected world, global competence includes tools for disrupting local and global injustices, which students can use to ensure that the communities they live in are diverse and equitable (Tichnor-Wagner, 2016). At its core, teaching for global competence is about supporting students in embracing mutual responsibility for our common humanity and shared global risks (Reimers et al., 2016). In creating a classroom environment that values diversity and global engagement, teachers who utilize culturally responsive and culturally sustaining pedagogy fill their classrooms with diverse resources that reflect the world's diversity of people and places and guide students to collaborate with those who have different ideas and worldviews (Tichnor-Wagner et al., 2019). Educators dedicated to developing engaged global citizens must provide students with opportunities for practicing and developing global competency, which begins with reflecting on their own pedagogical practices, or praxis (Freire, 1993).

Through their systematic review, Tichnor-Wagner et al. (2019) identify twelve elements that teachers are already implementing in their globally competent teaching; these are categorized by dispositions—such as empathy, valuing multiple perspectives, and commitment to equity worldwide; knowledge—such as understanding global conditions and events, the interconnected world, multiple cultures, and intercultural communications; and skills—such as being multilingual and being able to conduct global competence assessment and content-aligned global investigations, form global learning partnerships, engage in intercultural conversations, and foster classroom environments that value diversity. Tichnor-Wagner et al., (2019) then developed the Globally Competent Learning Continuum (GCLC) tool for teachers to self-assess the level of their pedagogical practices for each element on a five-point scale from “nascent” to “advanced.” On this continuum, assisting students in taking action to address global issues is what distinguishes advanced level globally competent teaching from the other levels (Tichnor-Wagner et al., 2019 p. 25).

Global Issues in Early Childhood Education for Environmental Sustainability

Sobel (2013) argues that teachers prefer studying rainforests with their students because rainforests are “tidier” to deal with than some other issues and do not generally involve taking students outside. He states, “to study rainforests, you can stay inside and look at pretty pictures of all those strange and wonderful animals and make miniature cardboard rainforests safe within the confines of the classroom walls” (p. 6). However, educational equity and educational access may not have been necessarily taken into consideration in his analysis. Many educators who teach in low-income schools and who work with historically minoritized populations do not always have the means or resources to explore local natural outdoors phenomena such as “the muskrats in the pond across the street” (p. 7) that Sobel references. Additionally, due to systemic racism in urban planning practices in the United States, a large majority of urban schools are located in areas with little to no green space or safe access to nearby green space. Sobel (2013) furthermore argues that “in-depth rainforest curricula may be perfectly appropriate in middle or high school, but it doesn’t belong in the primary grades” (p. 7). This assertion is highly debatable, as numerous standards-based English language development texts feature rainforests as a way to engage students in oral language development and language practice, both of which are key aspects of primary education. Moreover, this assertion belies the professional discretion of teachers, trusted professionals who will make pedagogically and developmentally appropriate choices for students. Sobel (2013) furthermore maintains that curricula featuring environmental problems “will be most successful when it starts in fifth or sixth grade and focuses on local problems where children can make a real difference” (p. 35). This fails to consider the children in kindergarten through fourth grade whose studies of social studies, English language arts, and fine arts typically explicitly include environmental problems in standards, curricula, or both. Young children are fully capable of learning about complex, interdisciplinary issues and taking action on such issues to make a difference in their world. The integration of high-quality civics and social studies education and student-centered learning contributes greatly to fostering such capacities in younger children. A foundation of global competency that begins in primary school (or even earlier) can help prepare these global citizens for more advanced study and action throughout their lives.

Early Childhood Education for Sustainability

Identifying and reflecting upon the theoretical foundations that inform my professional praxis (Freire, 1993) as a social justice educator are in line with Green’s (2015) assertion that scholars “must also identify the theories and methods that frame their approaches.... which stems from [their] philosophical assumptions in regard to childhood and environmental education” (p. 208). Historically, the practice of positioning children for action in early childhood environmental education and early childhood education for sustainability has existed on a continuum from encouraging them to take up educator-planned environment and sustainability action to actually “engaging [them] in research design, implementation, and data analysis” (Green, 2015 p. 224). The shift towards children as researchers requires environmental education professionals and scholars including elementary school classroom teachers to offer student-centered learning and allow students to choose their own topics, formulate their own research questions, choose appropriate data collection methods, collect and analyze data, and present the findings (Green, 2015 p. 226).

Toward such student-centered and inquiry based learning, I was most inspired by Belvins & LeCompte's (2015) practical and actionable "action civics framework," a social studies framework that intends to help students become informed citizens through engagement in critical, deep thinking that considers the multiple perspectives of a civics issue. In Phase 1, students attempt to identify understand and describe social or global issues of personal interest to them. In Phase 2, they explore the problem by researching their issues through a variety of resources and projects. In Phase 3, students develop plans of action for addressing the selected issue. Finally, in Phase 4, students share their results and findings at school, in their families and in the larger community. What most inspired me about this framework is that it asks students to learn about their world by taking direct action in that world in addition to exploring the many texts available.

Adults and children working together to make a powerful impact in the world can resonate deeply with people across generations. The Kid President enterprise, which includes videos that have been viewed by millions of children and adults worldwide is an example of such a collaboration. It began in 2013 when Roby Novak, then a fourth grader from Tennessee, and his adult brother-in-law Brad Montague created Kid President, a motivational character (played by Novak) with the intention of making the world a more "awesome" and "joyful" place. Kid President's words of wisdom (Novak & Montague, 2015) are delightful, and the characters' power lies in combining popular culture and "kid culture" to present powerful, meaningful messages in a format that is easily understandable by children and that encourages them to spread hope and joy and to inspire others. Kid President's three questions can help children identify things that they are passionate about, things they are good at, and things they can do to solve a given problem and thus make a powerful impact in the world. The questions are "What are you not okay with?" "What do you have?" and "What can you do?" I presumed that these simple but powerful questions could to encourage students to explore global sustainability issues and to see the relevance of such issues to their everyday lives.

Together, these two resources guided my unit plan outline and the structure and sequence of the interdisciplinary learning projects and framed my method of encouraging students as they developed understanding of deforestation in the Amazon rainforest. Students were already gaining basic background knowledge on deforestation through reading informational texts about animals and rainforests, as per the district-mandated, standards-based English Language Development (ELD) curriculum, and so I hoped to help them build on that knowledge by encouraging them to continuing exploring it in the project. Moreover, because of the many fields involved in the topic it seemed an appropriate for introducing students to interdisciplinary studies. Prior to the unit, students were very passionate about the subject, showed high levels of engagement, and kept asking for more projects, books, and activities related to this topic.

I mirrored Belvins & LeCompte's (2015) phases in the unit action plan I created to guide my pedagogy was separated into and used Kid President's three questions (Novak & Montague, 2015 p. 67) as essential guiding question for each phase. These questions were to frame students' thinking and help them capitalize on the background knowledge and personal experiences they would bring with them to each phase of the inquiry process. In designing Phase 3, the action development phase, I consulted Javna's (2009), which offers resources engaging activities for child environmentalists to empower them and show them they can make a difference. Additionally, similar to the Kid President's message, adults and children, teachers and students, are viewed as collaborative teams.

Developing a Social Justice Unit Plan

In a review of the methods, methodologies, and theories applied in early childhood environmental education research from 2004 to 2014, Green (2015) found that research studies were conducted across a continuum from research *on* children, to research *with* children, to research *by* children. Where each activity selected for each phase of the unit plan placed on the research continuum was also identified.

Phase 1: Identify a Problem (Week 1)

Survey of Students' Perceived Civic Agency. The school setting was an urban Title I public elementary school in South Los Angeles. In the participating kindergarten class of twenty-eight students, there were 13 English language learners, from average to intermediate levels. English and Spanish speakers were most common, and Portuguese,

Tagalog, and Arabic speakers were also present. To build fluency and academic vocabulary, “think-pair-share,” small, and whole group discussions were frequently held. Parental consent and student assent were obtained through parental forms and by students being given a choice to participate in the learning projects. Our syllabus included a forty-five-minute block (from 1:15 pm –2:00 pm) for “learning projects.” Four days a week, this became our Amazon rainforest projects time, or as one student called it, our “save the trees” time. I began by assessing students’ initial sense of civic agency using the question, “Can kindergarten students help change their community and help change the world?” They each wrote and drew their answers on a piece of paper. After all students had prepared an answer, we gathered as a class to share them. Each student shared their work, and I wrote their explanations on the backs of their papers and on sticky notes for future reference. In this representational activity to elicit students’ understanding and perspective on a given topic, phenomenological analysis was utilized to analyze the drawings paired with the behavioral observations (Christidou et al., 2013) that were recorded in a teaching journal.

Kid President Video. Next, we watched Kid President video *3 Questions That Can Change the World* (SoulPancake, 2014). Participating students had watched Kid President videos many times before in class and we used Kid President philosophies in creating our classroom culture. The first questions we used was: What are you not okay with? I wrote the question on butcher paper along with the sentence frame: “I’m not okay with _____.” I gave students time to engage with this question in “think/pair/share” sessions. Everyone shared their answers, and I recorded them on the butcher paper. The following day, we watched the video again, engaged in “think/pair/share” sessions, and made connections between the answers from both days. I circled the connections in pink marker for easy reference (See Appendix A). In this way, students identified, named, and discussed injustice that they found unacceptable. This scaffolded activity addresses the concern that “young children may have trouble articulating their thoughts and feelings, which could lead them to provide a single word-response” (Green, 2015 p. 221) by providing appropriate pedagogical support for English language learners and peer interaction through the “think-pair-share” sessions.

Phase 2: Explore the Problem (Weeks 2 and 3)

KWL Chart On Deforestation. To start the second week of the unit action plan, I created a KWL (know, want to know, learned) chart on a piece of butcher paper to use during class. I assessed students’ background knowledge of deforestation and recorded their answers in the “know” column of the chart. We talked about “deforestation and defined it together as a class. For the “want to know” column, I asked students what they wanted to know about deforestation and what specific questions they had about it. They engaged in “think/pair/share” sessions and then we held a whole group discussion. I recorded their answers in the “want to know” column on the butcher paper using a different color marker than for the “know” column. We then engaged in an interactive read-aloud from children’s books about deforestation (Greely, 2013) and filled in the “learned” column. This activity situates the teacher as sociocultural mediator (Diaz & Flores, 2001); it allows students to draw on their background knowledge and centers on their agency in the decision-making process. Using children’s literature to promote discussion and peer conversation about particular topics was an opportunity for doing research *with* children (Green, 2012).

Read-aloud of *The Lorax*. The following week, we performed an interactive read aloud of Dr. Seuss’ (1971) environmental parable *The Lorax* over three days. I marked pages with sticky notes to signal where I needed to pause the reading and model making inferences to enhance understanding, explain vocabulary words, ask questions, and ask students to make predictions. I divided the book into four segments to make it more accessible to kindergartners. During the reading, I drafted a bubble map graphic organizer on butcher paper to illustrate our progress. During the read-aloud of the first segment (pp. 1–10) I asked students to make predictions about what had happened to the Lorax, and I recorded their answers along with their names on the bubble map graphic organizer. In the second segment (pp. 11–22) I asked students, “Why is the Lorax so upset that the truffula tree was chopped down?” and added their thoughts and answers to the bubble map. In the third segment (pp. 23–50), I asked students to compare how the Truffula forest looked at the beginning of the story with how it looked at the end. They engaged in “think/pair/share” sessions, and we discussed answers as a class. I recorded their answers on the bubble map along with their names.

I hoped the reading would encourage students to begin thinking critically about why people cut down trees by exploring why the Once-ler (a manufacturer) was cutting down the Truffula tree and the effects of this on the forest.

To that end, we began a two-column T-chart. During “think/pair/share” sessions we listed the benefits of cutting down trees, in the context of the story, that is, what the trees could be used for, in the happy face column, and we listed the negative effects in the frowning face column. Students names were recorded along with their answers on the T-chart.

Read aloud of *The Great Kapok Tree*. We also held an interactive read-aloud of Cherry’s (1990) children’s picture book *The Great Kapok Tree*. In this story a man falls asleep in the Amazon rainforest after unsuccessfully trying to cut down a massive kapok tree. While he sleeps, an array of animals speak to him and explain how important the tree is for their survival. In this case, we engaged in “think/pair/share” sessions and individual question-and-answer sessions. We created a Venn diagram to compare and contrast the messages in Cherry’s book with the ones in Dr. Seuss’. We also discussed how each author portrayed effects of deforestation. I recorded students’ answers along with their names on the Venn diagram. Reading Cherry’s (1990) work helped them understand the Amazon rainforest as a habitat and an ecosystem, both of which are kindergarten earth science curricula standards. The beautifully detailed and realistic illustrations provided students with visual background knowledge on rainforest animals and the layered nature of the rainforest that they then used in a subsequent fine arts integration lesson. Utilizing representation art invites multimodal opportunities for students to create and represent their understandings (Green, 2012).

Math Integration. For the math integration section of the inquiry project, I asked students a question from Javna (2009): “How much of the Earth’s rainforest is destroyed every minute: Enough to fill the kindergarten yard (play area), enough to fill the cafeteria, or enough to fill 60 football fields?” (The answer was to be revealed in the Math integration section of Phase 3.) I created a chart with columns for each option and small illustrations to guide students reading (see appendix A). To introduce the question, I asked students if they knew how long a minute is and if it is a long or short amount of time. I explained that one minute is the same as sixty seconds, which is roughly the same amount of time as it takes to count from zero to sixty. For counting practice and to help give them a sense of the passage of time, we counted from zero to sixty, thereby integrating the kindergarten math standard of counting to a hundred. After the counting practice, I asked them, “During the time we were counting, how much of the earth’s rainforest was destroyed?” They presented their illustrated estimates on sticky notes after I modeled the answer form. We brought the sticky notes to the rug and discussed their answers in “think/pair/share” and whole group discussion formats. In the following weeks, we took a “math walk”, and each students counted how many steps it took them to cover the perimeters of the selected areas and recorded their answers. Through the utilization of math in this context, I hoped to further validate Peterson’s (2012a) argument for integrating math with subjects such as social studies to foster students’ understanding of social inequities and as both a language and a tool for explaining the world and global issues.

Class Amazon Rainforest Tree. During this phase of the seven-week unit, we also created a class Amazon rainforest tree to facilitate learning about the different layers of the rainforest, its climate, habitat, and animal inhabitants (See Appendix B). This project was completed over two days and incorporated science, fine arts, math, and English language arts. Prior to making the Amazon rainforest tree we took a “virtual fieldtrip” to the Amazon basin by watching a video overviewing the rainforest as one of the earth’s major habitats, the four layers that comprise it, its climate and temperature, the resources it contains, and the creatures that inhabit it (VirtualFieldTripsnet, 2014). After the video, we created a bubble map for recording rainforest facts. Students engaged in think “think/pair/share” sessions and whole-class discussions, and I recorded their answers along with their names on the bubble map. Next, we engaged in a fine arts lesson centered on drawing rainforest animals. Accordingly, we discussed the lines and shapes used to form each animal. For reference, we used Cherry’s (1990) illustrations and the video (VirtualFieldTripsnet, 2014). We transformed our alphabet identification tree into an Amazon rainforest tree so the creatures would have a home. I labeled the “canopy” and “understory” layers and added brown yarn and extra leaves to suggest vines. Students drew with pencils, markers, pens, and oil pastels. To informally assess their understanding of the layers of the rainforest, I asked each of them to identify the layer that their creature calls home and then stapled the drawings accordingly. This informal, standards-based assessment of students’ speaking and listening competencies integrates English language arts instruction with fine arts instruction. If effective, pairing informal assessment with artistic creation is supported by Green’s (2012) recommendation that representation art be “paired with other sources of data to increase the reliability of the findings” (p. 275-276). I played rainforest

sounds (UltimateRelaxation22, 2012) in the classroom while students were drawing to offer them an auditory experience as well.

Phase 3: Develop a Plan of Action (Week 4 and 5)

Penny Drive. In Phase 1 of the unit, I reintroduced the Kid President video (SoulPancake, 2014) and we discussing the remaining questions, “What do you have?” and “What can we do about it?” I wrote each questions on a piece of butcher paper along with the response sentence frames: “We have _____,” and “We can _____.” Students engaged in “think/pair/share” and whole-group discussions. I recorded their answers on the butcher papers along with their names. The ideas they generated were put into action during Phases 3 and 4. They developed productive answers, and many of them were convinced that saving the rainforest is a big job and that we would need money at some point. As a result, we decided to hold a penny drive. I sent home letters to parents explaining our project and that we were collecting pennies to donate to a rainforest conservation organization. We used the pennies we collected in another math integration activity; students practiced their number sense and counting skills by arranging pennies in groups of 2s, 5s, 10s, and 20s, thereby meeting a kindergarten math standard. After the penny drive, students wrote about their counting strategies during our writer’s workshop.

In order to support students in embracing their shared responsibility for our common humanity, we donated the funds collected in the penny drive to Kids Save The Rainforest, a non-profit organization started by children in Costa Rica after they witnessed the effects of deforestation on the local wildlife population. Specifically, our pennies contributed to support for a paralyzed three-toed sloth named Anakin, who was chosen by the students. After we watched a video (KidsSavingTheRainforest, 2016) about his story, students wrote about the experience. Through their fundraising work and subsequent donation, the class has progressed to the advanced level of the GCLC (Tichnor-Wagner et al., 2019 p. 25).

The Christmas Tree Farm and Environmental Responsibility. Toward encouraging further critical thinking about deforestation and to introduce the concept of environmental responsibility, we engaged in an interactive read-aloud of Purmell’s (2006) children’s picture book *The Christmas Tree Farm*, the story of a family who owns a Christmas tree farm and spends most of the year planting, cutting, and trimming trees so that they will be ready for the holiday season. I created a T-chart on a piece of butcher paper with the guiding question “In the story, was it okay that Grandpa was cutting down trees?” written at the top. I added a “yes” and a “no” column. Students then engaged in “think/pair/share” and whole class discussions on their thoughts and their answers, and I recorded their answers along with their names.

Math Walk. During this phase, we learned that according to Javna (2009), the answer to the question, “How much of the Earth’s rainforest is destroyed every minute?” is “enough to fill 60 football fields” (p. 45). To help students conceptualize this , we took a math walk around the school football field. I gave each student a sticky note and a pencil, and we walked the green line that painted around the field. Students counted their steps, stopping frequently to record their answers. When we returned to the class, I wrote the guiding question on a piece of butcher paper, and students added the sticky notes . After a few minutes of looking at all the different answers and calculations, students discussed their counting strategies in “think/pair/share” sessions and then as a whole class. Their responses were recorded on the butcher paper along with their names. Such exercises contribute to students’ development of critical consciousness (Ladson-Billings, 1995) by encouraging them to begin critiquing global and local issues, such as deforestation, at a young age, which prepares them for leadership roles.

Paper Recycling and Paper Making. In drafting our plan of action in Stage 3, one student constructed the sentence “We can create a class-recycling bin.” To implement this, I found a large cardboard box in the school copy room and put it near our class garbage can. Students began using it immediately. Students also recommended that we use more recycled paper. We had an aluminum casserole pan for recycled paper for our Letter Detective Center; during this phase, students added even more used papers for us to recycle. Students also recommended that we make our own paper. To implement their recommendation, we gathered paper pieces from the casserole pan and used butcher paper from the staff lounge and set about making paper. Our tools were a blender, empty aluminum casserole pans, aluminum foil, a strainer, water cups, and sponges. Small casserole pans of used paper were placed at each table, and students shredded the paper. Next, I blended the shredded paper with water. Students learned

the vocabulary words “pulp” and “environmental responsibility.” They took turns putting the pulp into the strainer and pushing the water out using their hands and a sponge. The paper was left to dry on aluminum foil and later used in an “upcycled” art project. By acting on ideas they themselves generate, students can experience truly student-centered learning. Students may also experience an increased sense of ownership over their learning when they see their ideas being directly put into action by peers and teachers.

Upcycled Art Project. The paper took a couple of days to dry. While we were waiting, we learned the term “upcycling” and created “upcycled” Mother’s Day gifts from the shredded paper scraps left-over from the paper making. At the beginning of the year, I saved small boxes from math manipulatives, and so each student received a small rectangular box. They glued the shredded paper to their boxes to create a mosaic vases (see Appendix B). We saved the parts of the box that had to be cut off, and one student said that they would be perfect painted red to look like ladybugs. In May, we will finish the project and create flowers with pipe cleaners and the handmade paper.

Language Arts Integration: The Writer’s Workshop. In February, the writer’s workshop curriculum focuses on students creating “All About ____” books” to practice writing informational texts about a specific topic. We chose to write about the rainforest and deforestation as a writing integration exercise, and students were able to demonstrate their knowledge about the rainforest from previous weeks. To establish a literacy-rich environment, I suggested they refer to our Amazon rainforest tree, and they did use it to help them label and illustrate their texts.

Phase 4: Share Results with the Community (Weeks 6 and 7)

Spreading Awareness of Deforestation Education. In this phase of the inquiry project, students wrote “All About Deforestation” books and began learning about persuasive writing and persuasive writing sentence frames. Previously, with the “we can ____” sentence frame, students emphasized that the school and the community needed to know about deforestation. As a result, I spoke with the school principal, and she enthusiastically agreed to feature the “All About ____” books from our writer’s workshop, writings and findings from our penny drive, and photographs of our interdisciplinary learning projects in the school’s March newsletter (see Appendix C). In this phase, we also conducted an educational awareness campaign, including creating posters and displaying them around the school (see Appendix B.). The posters featured writings, drawings, and examples of the projects that we completed in Phase 3. Phase 4, during which students present their findings in a developmentally appropriate way to the larger school community, primarily represents a *by children* approach (Green, 2015 p. 226) to research.

Survey of Students’ Perceived Civic Agency. To wrap up the seven-week interdisciplinary unit, I re-survey the participating students to assess their perceived levels of civic agency to look for changes or shifts from when they began seven weeks earlier. Students wrote and drew their answers and engaged in “think/pair/share” sessions and whole group discussion. I further recorded their verbal answers on the backs of their papers and on sticky notes for future reference.

DATA COLLECTION AND ANALYSIS

Data were collected throughout the seven-week unit using the following tools:

- Pre-unit survey of student civic agency (writing/drawing)
- KWL chart
- Student work from the Amazon Rainforest Tree” class project
- Charts and Venn diagram from Phase 3
- “All about_____” books from students’ writer’s workshop
- Pictures and student work samples from the Phase 4 action project
- Chart of students’ predictions of the answer to the math question.
- Students’ writings and findings on measuring school areas in steps (teacher’s journal; students’ notes)
- Penny drive writings
- Vocabulary word wall

Pictures of students taken throughout the inquiry project
 Post-unit student survey of civic agency at end of inquiry (writing/drawing)
 Teacher journal

I gathered student work samples completed during the seven weeks and grouped them by primary subject, i.e., science, math, social studies, art, and writing (see Table 1). Toward conducting an interdisciplinary analysis, I looked for general trends in students' learning and thinking across all subjects. I then looked for general trends within specific subjects. Through phenomenological inquiry-based data analysis, I sought to observe students' experiences and progression in thinking and learning about deforestation as a global issue during interdisciplinary learning. I paid special attention to the pre- and post-unit surveys of perceived civic agency to note any expanded sense of global competence.

Table 1
Interdisciplinary Learning Projects

Subject	Activity
Mathematics	Math integration answer prediction activity, i.e., "How much of the Earth's rainforest is being destroyed every minute? -Penny drive counting activity -Math walk counting activity
Visual arts:	-Class Amazon rainforest tree -Upcycled art projects -Deforestation posters
Earth Science:	-Class Amazon rainforest tree -Rainforest layers on the rainforest tree -Rainforest facts chart -Making recycled paper
Writing:	-"All About The Rainforest" books -"All About Deforestation" books -Penny drive writings -Anakin writings -Deforestation posters -Pre-unit survey of students' perceived civic agency -Post-unit survey of student civic agency
English language arts:	-Oral responses to teacher's question, i.e., "What layer of the rainforest does your animal live in?"

FINDINGS

Field notes, my reflective teacher journal, and student work samples were utilized to improve my teaching practices and analyze my pedagogical progress in teaching young students about global environmental issues. Throughout this process, inspired by Freire's (1993) concept of praxis comprising critical reflection and action, I confirmed that inquiry-based teaching strategies that encourage students to ask meaningful questions, research answers through interdisciplinary learning, and find meaningful solutions to their questions increase their self-determination. Through my experiences as an urban public school educator, I came to realize that children and adults experience the world differently and have different beliefs and thoughts about the environment; as such adults should not speak for children on environmental issues. To distinguish between my adult perspective and the students' perspectives, I will excerpt statements from students that I recorded in my teacher journal and offer a practitioner's commentary on their work samples. In this section, I hope to highlight the interdisciplinary nature of the inquiry and the flexibility of the teaching plan in terms of simultaneously meeting standards and allowing students to guide all phases of the unit with adult (teacher) support.

As noted, assisting students in taking direct action to address global issues constitutes advanced levels of teaching-learning along the GCLC (Tichnor-Wagner et al., 2019 p. 25). Thus, one of my main goals for the seven-week unit was to inspire students to understand deforestation and address it through direct action for change, locally and globally. I hoped to make the issue come alive for them and for them to understand it as personally relevant rather than as a passing topic in a book. Asking and answering meaningful questions is an important part of this process.

Pre- and post-unit assessment of perceived civic agency

I began the unit by assessing students' initial sense of civic agency with the question, "Can kindergarten students help change their community and help change the world?" Participating students seemed intrigued and engaged when this question was initially posed to them, and they responded to it with above average levels of optimism and energy. Many of them blurted out an enthusiastic, "yes!" without even taking time to think about the question.

As discussed, students wrote and drew their answers and participated in discussion. Most of them were literal in their responses, drawing sky, stars, and planets to represent the world and masses of black lines and a black ball to represent change. A lot of them wrote "yes" and "we can do it" and included symbols like the smiley face or the thumbs up. In most work samples, how this change could occur was not represented, only its possibility. Most students did not include themselves in the illustration or in their answers. However, three girls demonstrated a deeper understanding of the question; they drew themselves and their friends holding hands and working together and an image of the Earth. All three girls demonstrated high levels of perceived civic agency, and their answers suggested a working knowledge of collective action and referenced "working together," "teamwork," and enlisting the aid of friends. As noted, I repeated this survey at the end of the unit to see if there were changes in how they viewed the world and themselves after participating in projects that promoted and encouraged their civic agency.

I found the difference between the pre- and post-unit surveys remarkable, especially with respect to the drawings. For example, at the beginning of the unit, all students had optimistically and confidently agreed that they could effect positive change in the world, but they had struggled to express how or why. At the end of the unit, students illustrated an activity from Phase 4. Illustrations included the school corridors where we hung deforestation prevention posters, the class recycling bin, counting pennies from the penny drive, and donating pennies to help Anakin the sloth. Notably, most students included themselves in the drawings, clear pictures that symbolize working together, concrete examples of changes implemented as a classroom. Students post-unit responses also included much more writing, and they used more empowered and confident language, for example, "Yes we did," "We are brave," "We saved Anakin," "We counted pennies," "I feel happy," and "I did it!" When we debriefed as a class and all students had opportunities to share their answers, they wore expressions of pride, accomplishment, confidence, and joy on their faces.

Based on the observations recorded in my teacher journal and the significant shifts in student work samples and responses pre- and post-unit, I can conclude that the participating students experienced increased confidence and self-empowerment from taking action in our school and global communities. These findings validate Reimers et al.'s (2016 p. xi) argument that teaching for global competence is about supporting students in embracing their shared responsibility for our common humanity and shared global risks. I can furthermore conclude that the student-centered curriculum that positioned adults and children as teams that can work together made possible the development of the participating students' civic identities and the realizations that they are important and can make a real, positive difference in the world.

Inquiry Based Learning

Students' thoughts and ideas were included to structure the learning sequences in the unit from the very beginning. In Phase 1 (Belvins & LeCompte, 2015), we explored the first question from Kid President "What are you not okay with?" as the catalyst for inquiry and an essential frame. Students spent time exploring the sentence frame: "I am not okay with _____" in "think/pair/share" and whole class discussion (See Appendix A).

The application of sentence frames and “think/pair/share” is a standards-based pedagogical strategy for English language arts and English language development that is commonly utilized by teachers in most elementary school classrooms. Group discussions and peer-to-peer interactions constitute methods of conducting research *with* children; such research may be subject to the following limitations: children may mimic their peers, outspoken peers may silence less vocal students, and group members may be uncomfortable with one another (Green, 2012 p. 275–276). However, pairing students according to their English language development level, is an effective strategy in English language arts and English language development instruction. In my classroom, students work with their peers every day during English language development practice, and they utilize the sentence frames provided to differentiate instruction and as support for different levels of oral language competency and comprehension. As a kid speaking to other kids, the Kid President character served as a popular culture “hook” to capture student interest. Students naturally speak more when they are engaged and when they are interested in the topic.

I have found the Kid President videos effective in provoking, inspiring, and reaching children in a simple and powerful way. Students appeared to be immediately engaged and inspired and were able to speak freely about the question. Everyone had something to contribute and discuss, even introverted and beginning level English language learners who find such discussions challenging. Students’ answers were often simultaneously thought provoking, hilarious, and insightful. Some students were concerned about issues of global inequity: “I’m not okay with people being poor,” “I’m not okay with guns and violence,” “I’m not okay with shooting, punching, and kicking people,” “I’m not okay with some people not having food,” and “I’m not okay with stealing and taking money.” Others were concerned about perceived inequities at school: “I’m not okay with 4th graders having a longer lunch,” “I’m not okay with the big kids having a bigger recess,” “I’m not okay with [people popping] my space bubble,” “I’m not okay when I’m on yellow [on the behavior chart],” and “I’m not okay with people who don’t share.”

Students accumulated background knowledge on the global issue of Amazon rainforest deforestation in Phase 2 during weeks 2 and 3. We held read aloud from environmental picture books, integrated math and counting activities, and learned about the layers of the rainforest by making our Class Amazon Rainforest Tree (See table). This background knowledge they acquired prepared them for Phase 3: Develop A Plan of Action (weeks 4 and 5). To develop their action plans, students explored the second and third Kid President questions “What do you have?” and “What can we do about it?” (SoulPancake, 2014) using the appropriate sentence frames: “We have _____” and “We can _____.” Ideas generated by the students were put directly into action during Phases 3 and 4, demonstrating the flexibility of this interactive child-centered model. During these exercises, students appeared confident that they could use their words, voices, and actions to help directly effect needed changes: “We can tell people to not cut down the trees and help,” “We can tell people ‘this is a problem’ and ask for their help,” and “We can use our words, pictures, and writings and make speeches.” Our reading of *The Christmas Tree Farm* (Purnell, 2006) inspired students to make changes in our own classroom community: “We can make a recycle bin,” “We can save some papers for later,” “We can use one [paper] towel at a time,” “We can use only a little paper and then put it back,” and “We can make our own paper to use.” As noted, students voiced the practical concern that “saving the trees is a big job” and indicated a rather mature understanding that money and adult help and guidance would contribute to success. Students were very confident in my ability to help them take on this big job of “saving the world’s trees,” and one student remarked, “We can do it because we have a nice teacher to help us!” To measure up to their expectations and help them address their practical concerns through solid action, I suggested the penny drive to raise funds to donate to a rainforest conservation organization. Most parents helped their children collect pennies, and several parents told me about their students’ enthusiastic responses such as: “I was told that we need to save the rainforest, so we need to save our pennies,” and “[my child] told me that we have to save the trees.”

We were able to then use the pennies we collected, approximately twenty-six dollars, in math integration activities that, among other things, promoted their number sense and counting. Toward further integration, students wrote about their counting strategies during writer’s workshop sessions. After donating the funds to Kids Saving The Rainforest to help support Anakin, we watched a video (KidsSavingTheRainforest, 2016) telling his story, and students did more writing about the experience. Students seemed particularly eager to write during the “Anakin writings” sessions of our writer’s workshop and appeared to genuinely look forward to it. Personal comments from students include: “My mom and dad helped me get pennies so we can save Anakin and save the trees,” “Thank you Ms. Waite for showing us Anakin,” and “I’m glad we can help Anakin; he needs medicine.” Throughout the 7-week

inquiry, having their voices and opinions heard, understood, viewed as important, and put into action contributed to the development of students' critical consciousness (Ladson-Billings, 1995) and to their beginning to critique global and local issues and social inequities at a young age, which may prepare them to take on leadership roles.

Teachers' Roles

As noted, Diaz and Flores (2001) found that many teachers were taking on the sociocultural mediator role through awareness of and respect for the diversity of their students' sociocultural backgrounds and experiences. Accordingly, I treat classroom inquiry as a collaborative effort between teacher and students, and acknowledge students' ability to create knowledge in addition to receiving it. By immediately positioning students as capable of creating knowledge by asking them to engage with the Kid President questions, I embraced my role and identity as a sociocultural mediator, and my students were inspired and energized in the process.

In addition, supporting my students' voices, and embracing and encouraged their views of the world throughout the inquiry, I help students choose appropriate topics and provided them with guidance and support, thus fulfilling other important teaching roles. For example, during our whole-class discussions in Phase 1, I used pink marker to highlight student responses I believed would effectively guide them towards critically thinking about deforestation: "I'm not okay with animals dying," "I'm not okay with when people have no home," and "I'm not okay with someone taking my things." After highlighting those responses, I asked them if we had learned anything about animals dying and having no home. Their background knowledge obtained from informational texts on animals and rainforests (part of the ELD curriculum) allowed them to immediately made the connection: "The tree frogs...they're so cute!" "Monkeys live in trees, and when people cut down trees, they have no home," "Humans are predators to animals and trees," and "We should save the animals."

Another important role was interacting with and including them in the inquiry. For example, involving parents in the penny drive established a home-school connection: it positioned parents as learning partners taking on the big job of "saving the world's trees." This partnership-based strategy allowed all partners to contribute in decision-making process, including which global issue to examine. Most importantly, through these different teacher roles, I was able to ensure that student voices were literally integrated into the curriculum throughout the inquiry process, resulting in personally invested, engaged, inspired, and energized learners.

Student-centered interdisciplinary learning: Popular projects and activities

The creation of student-centered interdisciplinary learning projects resulted in high levels of student engagement, excitement, and passion; a deeper understanding and awareness of global issues; and in equitable pathways that encourage the participation all learners. To find out which projects most fulfilled these purposes for my students, I asked them directly what made sense to them, what challenged them and extended their learning, and what made their hearts happy.

The class Amazon rainforest tree was one of the most popular interdisciplinary projects. The two-day project incorporated science, fine arts, math, and English language arts. We took a "virtual fieldtrip" to the Amazon basin, engaged in "think/pair/share" and whole class discussions about rainforest facts, and took part in a drawing lesson. Requiring students to state which rainforest layer their creature belonged to before allowing it to be placed on the tree incentivized students to successfully retain the information; they were able to recall their creatures' rainforest layers two months later. This section of the unit appeared to have stimulated their oral language practice. Popular sentence types included: "I'm making a _____," "Look at my _____," "My _____ lives in the _____". Students looked forward to this community-building activity and the community art project. When we finished creating the tree and stood back and looked at it, most students were impressed; remarks included: "Wow, how beautiful!" "We are artists!" and "It looks like grownups did it!"

The penny drive was also greatly popular with students. It helped reinforce knowledge we obtained through prior study of economics, money, and different types of coins and dollar bills as required in the social studies curriculum; and facilitated smooth integration of math and speaking and writing. For example, in groups of two or three,

students practiced counting pennies in different ways and made various arrangements on the floor, including random piles, rows, stacks, and groupings. While they were working, I interviewed them in groups about their counting, mathematical thinking and counting strategies. Some strategies included grouping by 10 and making stacks of the same height counting the stacks. One student with excellent number sense lamented: "Counting by 10s takes forever!" I asked prompted him with the question, "Is there another number that you can count by?" He stated, "Twenty! I can count by tens, and two tens makes twenty! Now I'll count!"

During Phase 4, students' most beloved activities involved donating the funds raised in the penny drive to support for Anakin, the paralyzed three-toed sloth. They loved "meeting" Anakin in the video about his life (KidsSavingTheRainforest, 2016) and took a personal interest in his story. We learned sloth facts and discussed sloths at length. When I showed students the email we they responded enthusiastically: "We helped him!" "Now maybe Anakin can walk!" "My heart feels so happy!" and "I'm so excited!" Students expressed empathy and compassion when writing about Anakin: "Anakin the sloth is important because it needs medicine, and it is sad because he is hurt," "We can save Anakin and all the animals. Anakin is a sloth; the rainforest has Anakin," and "We can save money to save the animals. We can save Anakin and all the animals. I like Anakin." Students drew the our Amazon rainforest tree, labeled the layers correctly, and added Anakin to the correct layer. Without prompting, they consulted the tree to check the spelling of the rainforest terminology they used in their work. They became emotionally and personally invested in our quest to save Anakin, the trees in the Amazon rainforest, and all of the animals even continuing their discussions during recess: one student told me, "Ms. Waite, [my friend] and I are going to save the trees! We're making more plans!"

As noted, a crucial aspect of my philosophy of education is the belief that the most powerful teaching and learning occurs when students are fully engaged, inspired, and take a personal interest in what they are learning because it is relevant to their lives. As suggested by Peterson (2012a), through integration of math with social studies, language arts, and fine arts, students were able to better understand the issues at hand; moreover, they began using math as both a language and a tool for explaining and understanding deforestation issues. With such tools in their global competence toolbox, students will be able take further direct action toward making a difference in their local and global communities: their schools, homes, and world. I hoped that our project would show them that great things can happen when grownups and children work together.

Equitable Pathways Through Interdisciplinary Learning

The interdisciplinary approach not only resulted in a deeper understanding and awareness of the Amazon Rainforest and deforestation, but it also provided equitable pathways to promote participation by all learners in the class. For example, artistic and visual learners were thrilled to be creating their own animals and creatures for our rainforest tree. Students who love writing were deeply engaged in putting their best effort into their writer's workshop pieces, and the students with keen number sense were in their element during the penny drive counting activities. All of the participating students really love animals, especially small and cute one, so encountering Anakin and doing something to help him truly spoke to their hearts. The drawings produced in the writing integration activities presented numerous interdisciplinary connections: the use of different lines and shapes for the rainforest animals (fine arts, math, and earth science), writing numbers during the penny drive counting (math), listing the layers of the rainforest (earth science), and writing and speaking about how they helped Anakin (English language arts).

Implications for Teaching and Further Study

Teaching Global Issues to Young Children

Global competence should not be treated as an "add on" to curricula; it should be integrated across the curriculum and across subjects throughout the school year (Mansilla & Jackson, 2011). Global competence is a necessity in today's interconnected world, and as noted, teaching for global competence promotes shared responsibility and understanding of shared risks across the local-global continuum (Reimers et al., 2016). Additionally, as global education is interdisciplinary, and global competence should be taught across disciplines, assessment methods

should match content lesson objectives (Tichnor-Wagner et al., 2019 p. 203). Assessment should be viewed as something done in partnership with students rather than something done to them (Deardorff, 2018 p. 2).

Accordingly, after initial analysis of the data collected (as detailed previously), I went back and, very carefully tried to see my students' work through their eyes: What learning projects engaged them the most deeply, spoke loudest to their hearts, delighted and inspired them most intensely, and had the greatest impact on their worldviews? As a social justice educator committed to including students' voices, hopes, dreams, wishes, and interests in the curriculum, it only made sense that I included their voices in the analysis as well.

As more fully described above, I asked my students directly about which activities made the most impact on them. They all told me that working on the Rainforest tree, the penny drive counting and writing activities, and the Anakin writings were their favorites. After our conversations, I examined the student work samples to find additional answers on why those projects were so important to them, and I included my findings above.

I began the unit with the perceived civic agency survey because before we could work together as a class to understand and address global issues, I needed to understand their worlds and how they saw themselves in those worlds. I needed to learn about their experiences and hear their voices and their hopes and dreams for the future. For students' voices to be heard and understood, it is necessary to create a learning environment that is truly a community of learners and not just a classroom. The many outcomes of this seven-week unit were made possible because of the classroom culture that my students and I began building together on the first day of school. The project was the result of yearlong effort that came full circle, and the more we learned about the destruction of the rainforests in the Amazon basin, the more we learned more about ourselves. Perhaps most importantly, we learned through practice about some ways to take direct action toward making positive changes in our communities and the world. Moreover, through inquiry-based teaching, we, students and teachers, were released from our traditional roles, that is, teachers as transmitters of knowledge and the students as receivers. Instead, students were encouraged to take to ownership of and responsibility for their learning. This approach to teaching-learning global competency ensures that what students encounter in the classroom is relevant to their worlds and thus starts them on paths of lifelong learning. Interdisciplinary, student-centered, globally competent teaching-learning strategies serve as the cornerstone of social justice education by empowering students to empower themselves.

Limitations

As a social justice educator, I have high expectations for students, and I provide transparent and equitable paths and tools to achieve these. Additionally, I am very skilled in behavior management, and students have individual, small group, and whole class accountability systems and expectations. The many outcomes of this seven-week unit were made possible because of the classroom culture that my students and I began building together on the first day, combined with the strong routines and management systems that were established. Our syllabus included a 45 minute block (from 1:15 pm–2:00 pm) for "learning projects." For a total of four days a week, this time was dedicated to our Amazon rainforest projects. Thus, a strong classroom culture, the teacher's skills and training in behavior management, as well as time in the daily schedule to implement interdisciplinary learning projects, must all be taken into consideration for replication of the seven-week unit. Additionally, prior to engaging in the seven-week unit, students were already gaining basic background knowledge on deforestation through reading informational texts about animals and rainforests, as per the district-mandated, standards-based English Language Development (ELD) curriculum.

Plans for Future Research

In our interconnected world, and in the current sociopolitical moment, including a global pandemic, racial injustices, and the effects of a climate emergency, there is a clear need to help students of all ages prepare to engage with societal issues and gain the knowledge, skills, and capacities to participate in civic life (Rogers et al., 2020); they must learn to take action on environmental issues of local and global concern, using inquiry-based interdisciplinary teaching-learning strategies. As environmental issues and concerns are one of the most popular and widely used

contexts for civic education (NAAEE, 2020), establishing high-quality global environmental civics curricula is imperative in early childhood education as well as in kindergarten through twelfth grades.

These findings and practitioner reflections represent the beginning of a journey into creating an interdisciplinary global environmental civics curriculum, with foundations in social justice education pedagogy. Since the conclusion of the seven-week unit, I have used Belvins & LeCompte's (2015) practical and actionable "action civics framework," and Kid President's "3 Questions That Can Change The World" (p. 67) to frame interdisciplinary global environmental civics units when working with scientists and bringing their research into the classroom through inquiry-based teaching. I plan to expand upon these findings for my dissertation research for a Ph.D. in Sustainability Education.

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Appendix A
Teaching Materials

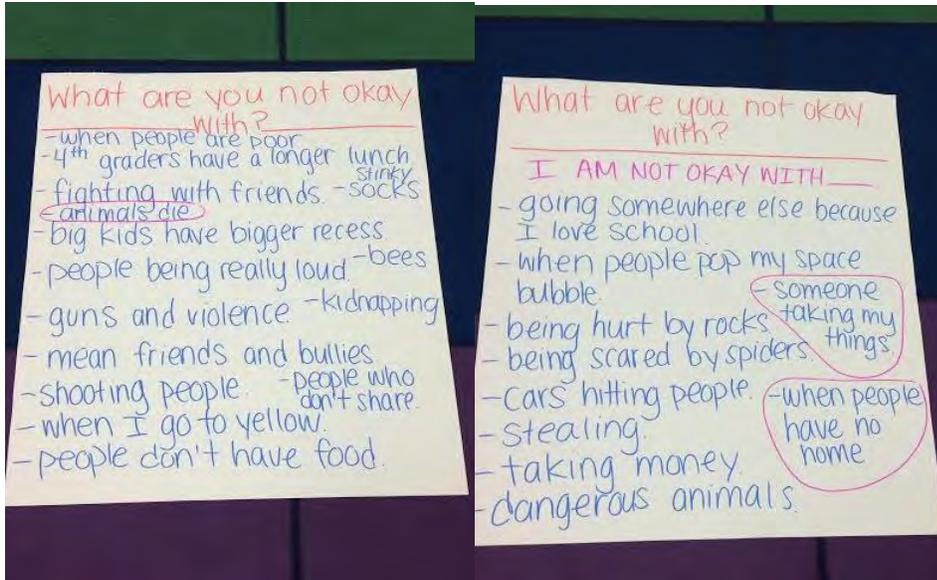


Figure 1. "I'm not okay with _____" chart

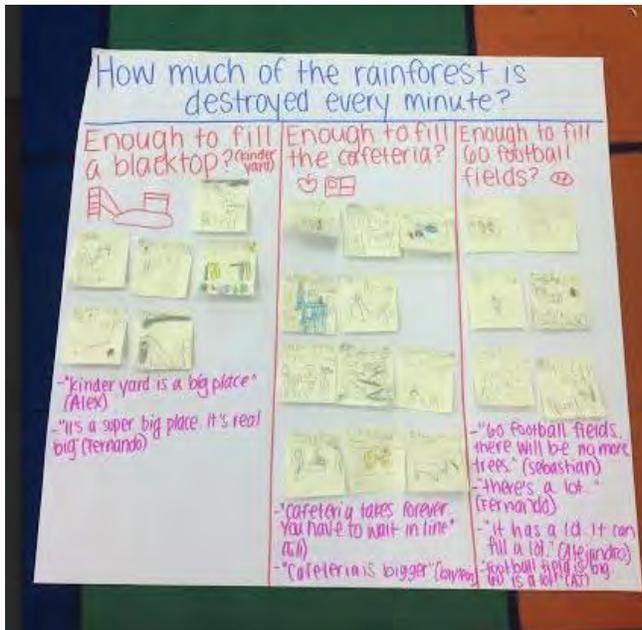


Figure 2. Rainforest Math Chart

Appendix B
Student Work Samples



Figure 1. Class Amazon Rainforest Tree



Figure 2. Deforestation Posters



Figure 3. Upcycled Mother's Day Vases with Flowers



Figure 4. Penny Drive Counting Pictures

Appendix C
Miscellaneous

Kindergarten Deforestation Experts:

The kindergarten students in Ms. Waite's class have become Deforestation experts! They did some amazing activities while learning about this topic. They turned their letter ID tree into an Amazon Rainforest tree to learn about rainforest letters, and they wrote "All About the Rainforest" books. They also did activities to help support the rainforests. They did a penny drive to collect money to donate to a rainforest conservation organization, they made hand-made paper to learn about recycling, and they have even started a class recycling bin. The students have also made posters to put around campus to teach all of us about this important topic.

Figure 1. Excerpt from March Newsletter