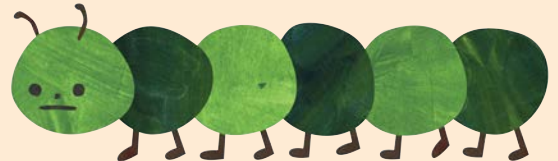




Creative Connections: Building Empathy to Foster Ecoliteracy Through Art Education



Jocelyn Salim



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by Jocelyn Salim

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Abstract

This thesis investigates the potential positive impact of fostering empathy and understanding for the natural world through art education. Through action research, this study examines various teaching approaches, such as incorporating scientific knowledge, employing literature to discuss ecological themes, and engaging in participatory storytelling activities to cultivate empathy among elementary school children. The objective of this thesis is to explore empathy as a potential pathway to encourage children to foster connections with the natural world and develop compassionate traits, attitudes, and behaviors towards nature as they grow. The findings of this study reveal that children exhibit high levels of enthusiasm and interest in discussing ecology and environmental issues, and they possess the capacity to develop nuanced thoughts and opinions about their relationship with the natural world. Additionally, it is observed that this process is more effective when children are provided with the opportunity and space to engage with these topics through age-appropriate activities that facilitate choice, agency, and creative expression.

CHAPTER 1:

Seeds to Sow



Background

My personal interest in this topic was sparked by my growing recognition of the potential benefits of integrating art education with other fields of study. Growing up, I experienced a schooling environment where art was always isolated from other subjects. I navigated a conventional art education curriculum that focused on teaching theories, techniques, and history. Rarely was there ever any crossover or collaboration with other fields of knowledge like the sciences or humanities.

Despite having grown my passion for art from a young age, my exposure to the diverse ways of integrating art into broader contexts was limited. While I respected art as a purely aesthetic or self-expressive pursuit, I have always had a heart for social justice and dreamed of leveraging my artistic skills to make a meaningful impact on my communities and address pressing social issues. My only formal introduction to how various artists use art as a tool for social justice was in the two years I studied art history in high school. I felt drawn to explore the intersection of art and real-world concerns, such as social inequality and environmental degradation. Yet, I found myself unsure of the role that art could play in addressing these multifaceted issues and how to bridge this gap effectively.

My initial exposure to the concept of climate change was probably during my formative years in primary and secondary school when I encountered the rudimentary aspects of this complex issue. Aside from poignant images of polar bears on shrinking ice caps, the oft-chanted mantra “Reduce, Reuse, Recycle” and the symbolic act of turning off the lights for Earth Day, I knew little about the intricacies of the climate crisis and environmental injustice. Yet, even then, I felt that there was a sense of urgency to this issue. I was also inspired and captivated by contemporary artists, such as Andy Goldsworthy and Olafur Eliasson, whose works, introduced to me through art theory lessons, delved into humanity’s intricate relationship to the natural world.

The significant turning point in my journey towards environmental advocacy transpired during my undergraduate years at RISD. The first time I properly engaged with the topic of environmental justice was in my History, Philosophy, and Social Sciences (HPSS) elective course focusing on global inequalities as a freshman. Of all the topics covered, the lectures and discussions around environmental justice issues stirred my curiosity the most. In the class, I did a case study presentation on Fashion Revolution, an international not-for-profit organization grappling with issues posed by the fast-fashion industry. I also embarked on a final research paper examining the systemic

environmental injustices within global waste systems, with a particular emphasis on the recycling sector. Since then, I decided to pursue a concentration in Nature-Culture-Sustainability Studies (NCSS) during my BFA, which enabled me to think comprehensively about art and other disciplines along with the responsibilities and potential that we artists have as creators.

Throughout the remainder of my undergraduate journey in Illustration, I sought to infuse my work with a critical, research-informed perspective cultivated through my NCSS courses, addressing various social and ecological concerns. Most of my peers in the NCSS cohort were students pursuing industrial design, architecture, furniture, or textiles, who were interested in exploring materials and biophilic design. There were very few in visual art and design departments who were interested in these topics and I often found myself to be the only voice from the Illustration department in the classroom. I felt that there was a lack of people working in visual storytelling and communication for the climate, which spurred my desire and motivation to fill that gap and make climate literacy more accessible through visual storytelling.

In my Junior year of college, I met Dr. Lucy Spelman, who taught a science class on human and animal interactions. Though she is a wildlife veterinarian by profession, she is passionate about teaching at RISD because she recognizes the potential of the combined efforts of artists and scientists in advocating for animal conservation. Her class illuminated the profound influence of art and design in conservation and the value it can bring to the field. Art can be used to simplify complex and abstract scientific concepts, rendering them more accessible, persuasive, and emotionally resonant. Dr. Spelman explains that art has the power to raise awareness, educate, evoke emotions, and prompt people to “think through looking, and look through thinking” (L. Spelman, personal communication, 2021). This pivotal encounter ignited my interest in exploring the interdisciplinary nexus between art and other fields of study to create something meaningful.

I continued to work with Dr. Spelman throughout my Senior year. I took another class with her and Professor Jean Blackburn called ‘Visual Stories of Natural History,’ which delved into various scientific research and documentation methods that visually represent data. During Wintersession of 2022, I also had the opportunity to travel to Kona, Hawai’i, for a travel course on the Art and Science of Conservation alongside Dr. Spelman and Professor Andrea Dezsö. The immersive experience in Kona exposed me to the rich tapestry of Hawaiian history, culture, and stories that connected people to their natural environment and how that intertwined with other aspects of their lives. For many people there, the reverence for all beings, both human and non-human, was intrinsic, fostering a deep and intuitive respect for the environment.

My journey led me to Accra, Ghana in the summer of 2023, where I embarked on a 2-month internship at Kokrobitey Institute,^{*} a non-profit organization dedicated to sustainable design. In Ghana, I once again found myself fascinated by the profound relationships people had with the natural environment. For example, fishing is prohibited on Tuesdays because it is believed to be a day for the sea to rest. During my time at the institute, I worked on an independent research project, collaborating with a local photographer, Morris Frimpong, to document, celebrate, and raise awareness about Ghanaians’ relationship with water and the ever-evolving state of local water systems. This project opened my eyes to the myriad ways in which water intertwined with the fabric of daily life, history, culture, and spiritual beliefs.

Kokrobitey Institute was founded by Ms. Renee Neblett, who saw the potential in Africa and its people to be innovators of environmental change by investigating traditional knowledge and technologies for their relationship to modern development. It emphasizes the importance of “real literacy” which Ms. Neblett defines as our “ability to read the environment - to know what

* <https://www.kokrobiteyinstitute.org/>



Figure 1.1
Batiking at Kokrobitey Institute



Figure 1.2
Bales of second-hand clothes from Kantamanto Market at the Or Foundation

nature gives us, and what we are obliged to give it in order to secure a sustainable future” (Neblett, 2022; R. Neblett, personal communication, 2023). These immersive experiences underscored the importance of “real literacy” which encompasses one’s ability to understand their environment, transcending mere written and spoken language. The wonderful people at Kokrobitey Institute are always thinking of new and creative ways to repurpose various materials and reinvent them into something completely new and elevated.

While in Accra, I had the privilege of visiting the Or Foundation,^{**} a non-profit organization that works at the intersection of environmental justice, education, and fashion development. Their mission is to empower individuals to regain choices and reclaim agency within a predominant socio-economic system tainted by corporate colonialism. It was at the Or Foundation that I encountered the concept

of “waste colonialism” (Ricketts & Skinner, 2023) for the first time. Ghana stands as one of the globe’s largest importers of second-hand clothing from economically wealthier countries, with Kantamanto Market serving as the epicenter, receiving hundreds of tons of clothing daily, many of which are beyond repair and ultimately find their way into local landfills. Among the Foundation’s remarkable endeavors, I was particularly intrigued by their innovative approach to repurposing waste materials. They actively procure

textiles that would otherwise be discarded at Kantamanto, diverting hundreds of pounds a month away from landfills and open dumping sites, and transforming them into new wearables and functional objects. These upcycling projects create alternative economic opportunities, especially for young women and girls living in challenging conditions and working as ‘Kayayei’ (head carriers). During my visit, I also witnessed their experimentation with shredded cotton t-shirts bound with natural glue made from cassava along with high pressure and temperatures to create sturdy

** <https://theor.org/>

furniture and building materials. The Or Foundation's studio and office spaces were adorned with beautiful furniture and decor fashioned from these recycled textiles, showcasing the transformative potential of sustainable design practices. Furthermore, the Foundation's dedication extended to scientific exploration, featuring a science lab where they analyze water samples from local systems contaminated by textile waste. Currently, they are also researching the potential of recently discovered microbes capable of breaking down plastics. The Or Foundation's work is a prime example of how scientific research paired with art and design can have profound impacts on the community.

These experiences offer only a glimpse into the wealth of knowledge I've accumulated over the past few years, guiding my ongoing journey as both an artist and educator. Each encounter has played a pivotal role in shaping my perspective on the intersection of art and climate and environmental literacy. Along this path, I have connected with so many incredibly knowledgeable and insightful people who are already deeply engaged in this important work, and they show me that there is hope and abundance for the future. At the heart of all these experiences and wisdom imparted by my mentors lies the fundamental concept of empathy. They underscore the importance of empathizing not only with fellow humans, but also with other organisms that we share planet earth with, emphasizing the need to recognize that we are *a part of nature* rather than being *apart from* it.

While empathy is not the ultimate end goal, my hope is that facilitating experiences for children to cultivate empathy for and form connections with the natural world

will foster compassionate traits, attitudes, and behaviors towards nature as they grow. Empathy itself is an abstract concept that proves challenging to quantify or assess, and is not inherently linked to any specific course of action. It is also important to note that I am not suggesting that the climate crisis and the environmental challenges confronting our world today are solely the responsibility of individual efforts. I recognize that these issues are complex as they are interwoven with systemic, social, political, and economic factors that must be addressed for a sustainable future to be achievable. However, nurturing empathy for the



natural world and cultivating ecological sensibilities has the potential to contribute to fostering generations of empathetic and ecoliterate planetary citizens who, collectively, can advocate for change towards a future where all life on earth can thrive.

Building empathy is the initial step towards “rediscovering” our relationship with nature, challenging the dominant anthropocentric perspective that suggests we are separate from it. “To accelerate sustainable transformation, we need the more profound motivation that an empathic connection with the Planet could bring” (Talgorn & Ullerup, 2023, p. 2).

With this thesis, I aspire to continue my journey of exploration and expand it to the realm of art education, thinking about how art can serve as a catalyst for fostering empathy and understanding of the natural world and promoting harmonious relationships between humans and the environment.

Figure 1.3
Illustration about the conflict between komodo dragons and humans in Indonesia, from Dr. Lucy's class: biology of human-animal interactions.

Introduction to Research

In 1962, Richard Buckminster Fuller wrote the influential book, *Education Automation*, in which he critiques prevailing educational paradigms and outlines a new approach to education. Buckminster Fuller was a highly intellectual individual who wore many different hats, and he described himself as a “comprehensive anticipatory design scientist” (Design Science, 2022), which encapsulates his holistic approach to problem-solving through interdisciplinary systems thinking. As a humanitarian, his overarching goal was to mobilize individuals to efficiently utilize the Earth's resources to ensure the prosperity of humanity in the present and beyond without compromising the ecological integrity of the planet. In *Education Automation*, he stressed that the current educational system of rote memorization and standardized testing fails to adapt to a rapidly evolving world. Written in light of the technological revolution, Buckminster Fuller emphasized the importance of leveraging technology to streamline and enhance the educational process, liberating students from technical tasks and enabling them to realize their potential to think critically, imaginatively, and comprehensively. He believed that every individual possesses an innate capacity to make sense of the world holistically, yet traditional educational systems teach children to categorize and understand the world in differentiated parts.

Though *Education Automation* was written decades ago, Buckminster Fuller's insights into education remain profoundly relevant today. Based upon my observations, experience, and research so far, it seems to me that despite significant advancements in holistic education research and practice, the predominant educational systems of the majority of schools internationally still grapple with the same issues that Buckminster Fuller articulated in his book—prioritizing standardized testing, rote memorization, and uniformity over personalized learning, critical thinking, and creativity. From an early age, students are subjected to rigid learning methodologies, which often necessitates unlearning later in life, perpetuating a cycle that impedes growth and innovation.



Buckminster Fuller recognized the pivotal role of artists in society, asserting that:

Artists are now extraordinarily important to human society. By keeping their innate endowment of capabilities intact, artists have kept the integrity of childhood alive until we reached the bridge between the arts and sciences. Their greatest faculty is the ability of the imagination to formulate conceptually. Suddenly, we realize how important this conceptual capability is ... Artists are really much nearer to the truth than have been many of the scientists. (Fuller & Snyder, 2010, emphasis mine, pp. 127-128)

Art stands out to me as a discipline uniquely positioned to encourage individual creative expression and critical thinking in students. I believe art education holds the transformative potential to empower students of all ages to push boundaries and realize their full potential as agents of change in the world. I also believe art education can readily build ecological literacy or ecoliteracy. The pressing challenges of our time demand educational programming that transcends disciplinary boundaries to foster a more holistic understanding of the world. There is an urgent need to cultivate a generation of learners who comprehend the world and our role in it in a comprehensive way rather than in isolated parts. This necessitates interdisciplinary approaches and collaboration among educators to facilitate more interconnected, adaptable, and experiential learning experiences. Thus, this thesis will explore ways art education can promote ecoliteracy and enhance our relationship with the natural world by nurturing empathy and understanding, serving as a foundational step toward addressing broader global issues.

Empathy, in essence, involves the capacity to understand and take the perspective of another being. In his 2017 TEDx talk, psychologist Jamil Zaki sheds light on the concerning trend of diminishing collective empathy. However, he dismantles the notion that empathy is an inherent trait and instead shows that empathy is a skill that can be cultivated over time. Through practice, individuals can develop empathetic habits and eventually become empathetic people. Although empathy is traditionally associated with human relationships its capacity has been shown to extend beyond interpersonal dynamics to encompass the ability to empathize with the natural world (Talgorn & Ullerup, 2023; Budnik & Ernst, 2022). This type of empathy has been given different names, such as “new empathy” (Dolby, 2012, as cited in Talgorn & Ullerup, 2023) and “entangled empathy” (Gruen, 2015, as cited in Talgorn & Ullerup, 2023). Empathy can be broadly categorized into two main types: cognitive and affective. Cognitive empathy refers to the capacity to recognize and understand the thoughts and feelings of others, as well as take the perspective of another (Budnik & Ernst, 2022). On the other hand, affective empathy involves sharing in the emotions experienced by another, potentially leading to empathetic behavior (Budnik & Ernst, 2022). Recent research shows that cultivating cognitive and affective empathy for the planet has the potential to be a catalyst for conservation and climate justice action (Budnik & Ernst, 2022).



Figure 1.4
Silver lining during sunset at Pu'uhonua O Honaunau National Historic Park, Hawai'i

Throughout this thesis, I employ the terms ‘nature’, ‘the natural world’, or ‘the planet’ to encompass a broad spectrum of agents and forces that constitute our planetary ecosystem, including animals, plants, rocks, landforms, waterbodies, sites, and man-made objects, to name a few. In this research, I am interested in exploring these questions: How can art education contribute to building ecoliteracy and nurturing a harmonious relationship between people and the natural world? How can art education empower young learners to make a difference in their communities? What are some strategies to build empathy for the natural world in young learners through art education? What are the outcomes of merging art education and environmental education in an interdisciplinary, intergenerational, and community-engaged approach? What could an art education curriculum that focuses on empathy and ecoliteracy look like?

CHAPTER 2:

Fertile Soil

While preparing for this thesis, I have engaged with a vast array of literature produced by scholars and researchers whose insights have laid the groundwork for my own work. In this literature review, I will explore the meaning of “ecoliteracy,” investigate the impact of fostering empathy for the natural world on children and youth, and examine various approaches in art and environmental education that enhance empathy and understanding for the natural world. It is important to acknowledge that the scope of this review is limited and I was unable to encompass all the influential works that have shaped my thinking and/or enriched my research. I encourage readers to explore additional resources in the further reading section for a comprehensive list of resources that can supplement and enhance their understanding of this topic.



Emotionally and Socially Engaged Ecoliteracy

First of all, what is “ecoliteracy”? The terms environmental literacy, ecological literacy, and ecoliteracy have been thrown around in many different contexts in the past few decades, and sometimes used interchangeably, but there is no one agreed definition of what it means or what it encompasses, which led to scholars arguing that they practically have little useful meaning (McBride et al., 2013). When the term ‘literacy’ was first coined, it was used to determine one’s ability to read or write. However, in current dictionaries, the meaning of literacy has expanded and evolved to include the capacity to comprehend, analyze, engage, and respond meaningfully to the multifaceted issues and challenges prevalent in today’s society (McBride et al., 2013). Environmental literacy, ecological literacy, or ecoliteracy is commonly stated as one of the goals of environmental education, yet these terms are not included in standard dictionaries. The UN Educational, Scientific, and Cultural Organization (UNESCO) established a definition and goal of environmental education which is “to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones” (Hollweg, K. S. et al., 2011). Although scholars and researchers use these terms differently, the general concept involves being attuned to the environment and the issues and challenges surrounding it, as well as having the knowledge and skills necessary to create a sustainable community for current and future generations.

My own understanding of what it means to be “ecoliterate” is rooted in ideas and teachings that initially inspired me to begin this work. During the preparation for this thesis, the words of educator and philosopher Paulo Freire (1983) deeply resonated with me. In his article “The Importance of the Act of Reading,” he emphasized that “reading is not exhausted merely by decoding the written word or written language, but rather anticipated by and extending into knowledge of the world” (p.5). In his work, he defines literacy as a holistic comprehension of the world through lived experiences, embodiment, relationships, and contexts. Freire illustrates this concept by saying, “The earth was my blackboard; sticks; my chalk” (p. 8), suggesting that even before formal education, he considered himself

literate. He emphasizes that the ability to read and write in a universally understandable language should not be separate from one's capacity to "read the world". "Reading the world always precedes reading the word, and reading the word implies continually reading the world...Even the spoken word flows from our reading of the world." (p. 10)

Similarly, my involvement with the Kokrobitey Institute transformed my understanding of literacy about the environment. One of the core visions of Kokrobitey Institute is to build on traditional Ghanaian knowledge to bring about a sustainable future and broaden our perspective on what it means to be literate. During personal conversations, and as frequently mentioned in her interviews, Ms. Neblett often fondly recounts her initial visit to Ghana and the profound wealth of knowledge she discovered among the locals. For centuries, diverse Indigenous cultures have consistently demonstrated a deep ecological sensitivity, recognizing that humans are part of the natural world, and establishing intimate, familial connections with nature, including animals, plants, and sites (Bertling, 2023). Despite their lack of formal academic education in comparison to people in economically wealthier countries, they possess a unique kind of knowledge that is increasingly rare and challenging to attain in today's society.

...Everyone was so conversant with the environment. It seemed as though nearly everyone knew every shrub, leaf, and tree...I was completely overwhelmed by a body of knowledge I did not have. In fact, in retrospect, the experience completely transformed and expanded my understanding of what it means to be literate. I believed, like most of us, that literacy was confined to the ability to read, write and comprehend the written word. Real literacy, however, is the ability to read your environment, to know what nature gives you and what you are obliged to give it in return. (Neblett, 2022)

Thus, building on these definitions for the purposes of this thesis, my definition of ecoliteracy encompasses the ability to understand the natural world (local biodiversity and ecosystems), recognize the many interconnections between humans and nature, and recognize and take

responsibility for environmental stewardship that supports all forms of life on earth in the present and future.

Continuing from here, I am interested in cultivating socially and emotionally engaged ecoliteracy through art education, focusing on fostering empathy as a means to promote ecoliteracy. My inspiration is an educational model founded on the integration of emotional, social, and ecological intelligence. This model was conceptualized by Goleman, Bennett, and Barlow (2012), who recognized the pressing need to address the threats facing our earth's life support systems and advocated for a new ecological sensibility. They emphasized that the intricate network of connections that make up our global society has resulted in an extensive blind spot regarding the impacts of human behavior on natural systems. These impacts are often overlooked or dismissed as they seem invisible or too distant and intangible for us to fully comprehend. However, they proposed that fostering emotional, social, and ecological intelligence can help us effectively address these impacts and threats to the natural world. (Goleman et al., 2012).

Rather than conceive of these as three separate types of intelligences, we posit emotional, social, and ecological intelligence as essential dimensions of our universal human intelligence that simply expand outward in their focus: from self, to others, to all living systems. We also conceive of these intelligences in a dynamic relationship with each other: Cultivate one, and you help cultivate the others. (p. 7)

In the classroom, social and emotionally engaged ecoliteracy has the potential to harness the benefits of social-emotional learning that promotes student success, while also engaging both teachers and students in immersive, hands-on learning experiences within the natural world and community settings. The authors identified two key dimensions of socially and emotionally engaged ecoliteracy: the affective dimension, which relates to emotions and empathy for all forms of life, and the cognitive dimension, which pertains to our understanding and perception of natural systems, with an emphasis on the capacity for systems thinking. Additionally, they highlight that socially and emotionally engaged ecoliteracy is not an individual achievement but rather emerges through collective effort and the nurturing of relationships.

The five practices of emotionally and socially engaged ecoliteracy outlined by Goleman et al. (2012) are as follows:

1. Developing empathy for all forms of life

Shifting our culturally dominant anthropocentric view to a perspective that recognizes humans as being a part of the natural world that shares the same needs as all other forms of life on earth.

2. Embracing sustainability as a community practice

As demonstrated by nature, life does not survive in isolation but rather flourishes in diverse communities with strong relational networks.

3. Making the invisible visible

Reveal and recognize the far-reaching impacts of human behavior on other people, biodiversity, habitats, landforms, and water systems.

4. Anticipating unintended consequences

Embracing a systems thinking approach and precautionary principle when predicting the potential implications of our actions while simultaneously acknowledging and creating strategies to address the possibilities of unforeseen consequences.

5. Understanding how nature sustains life

Understanding the interdependent relationships that uphold an ecosystem and adopting a lifestyle that meets the needs of the current generation while preserving nature's capacity to sustain life for future generations.

In this thesis, I will primarily be focusing on developing or nurturing empathy as a strategy to promote ecoliteracy among young learners.



Empathy as a Pathway to Connecting with Nature

Bertling (2023) notes that “as an ecological paradigm involves a comprehension of the self as part of a larger, more complex whole, it requires an expanding of consciousness for other living things and the environments upon which they depend” (p. 41). Beery et al. (2020) observed that in adulthood, those who had a connection with nature during childhood tend to demonstrate environmentally friendly attitudes and behaviors. Furthermore, they elaborate that “connection to nature was seen as a multidimensional construct that is place-based, associated with child voice, and closely aligned with empathy” (p. 8). Empathy can be broadly defined as the capacity to take the perspective of someone else and understand how they feel (Talgorn & Ullerup, 2023; Budnik & Ernst, 2022). It is typically used in the context of human relationships, but researchers have begun to explore empathy towards the natural world and inanimate objects (e.g. Batavia et al., 2021; Dolby, 2012; Gruen, 2015 as cited in Talgorn & Ullerup 2023; Budnik, L. & Ernst, J. 2022; Lithoxidou et al., 2017; Beery et al., 2020), and the processes of developing empathy towards the natural world are hypothesized to develop similarly to the development of empathy with other humans (Ruckert, 2016; Myers, 2007; Tam, 2013, as cited in Budnik & Ernst, 2022). It is also suggested that there may be a connection between empathy with humans and empathy with nature: for people who consider themselves a part of nature, their experience of empathy towards other humans includes empathy towards the natural world, and vice versa (Tam, 2013, as cited in Budnik & Ernst, 2022; Lithoxidou et al., 2017). Empathy takes shape in three primary forms: understanding or imagining the perspective of another entity (cognitive empathy), emotionally connecting and identifying with another entity (affective empathy), and being driven to address the concerns of others (empathic concern/motivational empathy) (Talgorn & Ullerup, 2023; Budnik & Ernst, 2022).

Surprisingly, the term empathy originally referred to an emotional connection with art and non-human, natural entities before it was applied to the understanding of other people (Lanzoni, 2018). As people begin to rediscover the roots of empathy, fostering empathy for the natural world becomes increasingly crucial, especially given the pressing

environmental challenges we face today, as it has the potential to catalyze prosocial and conservation behavior in the long run (Budnik & Ernst, 2022). It has been proven that empathy significantly influences attitudes during early childhood (Gassin, 2002, as cited in Lithoxidou et al., 2017) and it is recognized as an emotional state that can be nurtured (Pickens, 2009, as cited in Lithoxidou et al., 2017). Research has also shown that when children develop a high level of empathy they tend to display prosocial behaviors toward others, such as comforting or helping a peer in distress (Miller & Janson Op de Haar, 1997; Miller et al., 1996 as cited in Budnik & Ernst, 2022). Another study suggests that the development of empathy in children may contribute to the development of prosocial traits throughout adolescence and adulthood (Eisenberg et al., 1999, as cited in Budnik & Ernst, 2022; Lithoxidou et al., 2017). Additionally, David Sobel (1996), a longstanding advocate for fostering empathy in young children, suggests that it lays the groundwork for environmental stewardship as the child grows (as cited in Budnik & Ernst, 2022). Empathy is one of the driving forces behind positive action or behavior toward the natural world (Budnik & Ernst, 2022). As stated by Lithoxidou et al. (2017), “both ecocentric values associated with creating a caring relationship with nature, and the development of empathy, can become vehicles of transformation towards a society based on ecological principles” (p. 68).

Furthermore, research suggests a positive correlation between empathy for the natural world and environmentally friendly behaviors (Tam, 2013, as cited in Budnik & Ernst, 2022). Budnik and Ernst (2022) pointed out that the strength of the relationship between empathy and behavior depends on how closely the behavior is tied to emotional experiences. For example, feelings of connection and kinship with nature can increase empathy towards the natural world, which in turn can encourage environmentally friendly behaviors. One of the ways that environmentally friendly attitudes can be fostered is through “creating sentiments, feelings of care, and developing a sense of responsibility for other beings” (Lithoxidou et al., 2017). As mentioned in the first practice of emotionally and socially engaged ecoliteracy, developing empathy for

all forms of life involves recognizing our shared needs with other organisms, including air, food, water, shelter, and conditions conducive to survival. In the process of developing empathy, “it is important to identify our common needs with someone in a difficult situation, as we care more for those whom we recognize similarities and perceive to have links with ourselves (Reykowski, 1984; Warnock, 1996; Lian and Mathis, 2016; Parsons, 2016, as cited in Lithoxidou et al., 2017).” However, Budnik and Ernst (2022) also caution that empathy alone may not be sufficient to spur these behaviors, especially when they involve abstract or complex actions. Nonetheless, empathy is still a significant catalyst for cultivating ecoliteracy and potential future habits of care for the environment during a child’s development.

Early childhood is a significant time for children to foster connections with the natural world. Research shows that Beery et al. (2020) highlight that children perceive the world differently from adults, as they remain attuned to the “magic of life” (p. 17) and pay close attention to intricate details that adults tend to overlook. In the development of children’s understanding of the world around them, empathy can be cultivated and nurtured in various ways. One primary approach to fostering empathy in young children involves facilitating role-taking activities. Lithoxidou et al. (2017) noted that as empathy develops, so does the ability to take on roles and see things from another’s perspective. They identified three forms of role-taking (affective, perceptual, and cognitive), all of which necessitate the person to challenge their own perspective and to overcome it. Additionally, they also emphasize that during early childhood, affective role-taking—understanding the emotional state of another entity—is particularly important.



Children commonly perceive their world through magical thinking (believing in the possibility of events that defy conventional causality), animism (endowing inanimate elements and objects with consciousness and agency), and anthropomorphism (attributing human characteristics to non-human entities) (Beery et al., 2020). These perspectives and ways of thinking can provide a pathway to fostering children's connection with nature, while scientific concepts can be gradually introduced to further enhance and solidify their understanding of the natural world (Beery et al., 2020). Storytelling and role-playing can serve as vehicles for conveying information, thereby bridging the spatial and temporal gap between the individual and the direct personal encounters (Lithoxidou et al., 2017). The next section of the literature review will delve into the role of storytelling in fostering empathy for the natural world.



Storytelling as a Strategy to Build Empathy

One approach to introducing complex topics about the environment and fostering empathy in the art classroom is through storytelling. A study by Talgorn and Ullerup (2023) highlights that a common obstacle in sustainability efforts is that people have difficulty relating to the natural, non-human world. In their study, they explore and confirm the “role of stories and imagination in creating a bridge to the natural world through new, human and non-human, perspectives” (p. 1). Children’s literature has proven to be effective in acting as a guide to invite discussions of complex social issues which help to connect students’ learning in the classroom to the real world (Hawkman et al., 2022) and strengthen classroom communities. Children’s literature also promotes social-emotional literacy (Harper, 2016) and has positive impacts on students’ growth in problem-solving, values development, interpersonal skills, and sense of community (Cornett & Cornett, 1980, as cited in Borders & Paisley, 1992, p. 131). Additionally, stories—fiction or non-fiction—can support the development of children’s perspective-taking skills (Ornaghi et al., 2014, as cited in Budnik & Ernst, 2022).

Children’s literature and media provide opportunities for young learners to grow in the way that they relate to one another within and outside of their classroom community (McCarthy, 2020), and opportunities for both teachers and students to critically engage the world around them (Hawkins et al., 2022). They act as mirrors, windows, and sliding glass doors (Bishop, 1990, as cited in Hawkman et al., 2022, p. 2) to help students see themselves, others, and enter new and different worlds beyond their lived experiences (Hawkman et al., 2022). These tools can help students to feel connected to the past, present, and future world around them (Tschida et al., 2014, as cited in Hawkman et al., 2022, p. 2) and empower them to be empathetic global citizens. In the words of JoEllen McCarthy (2020), “stories invite rather than impose” (p. 5). Bringing in children’s literature in the art classroom can help create a safe space for students to share insights, personal stories, and experiences related to the themes and issues presented in the text (Gregor & Green, 2011; Labadie et al., 2012 as cited in Hawkman et al., 2022, p. 4), fostering personal connections for both teachers and students (Hawkman et al., 2022).

There is an overwhelming amount of evidence that elementary students are interested in engaging in discussions of complex social issues (Hawkman et al., 2022). However, many teachers are deterred from talking about these topics with their students due to having a lack of content knowledge and fears of being ill-prepared to engage students in discussions of complex issues connected to the real world (Bazemore-bertrand, 2020 ; Hawkman et al., 2022). Nonetheless, research has shown that children's literature can serve as a tool to facilitate those discussions and bring in positive impacts to the classroom. In her introduction to *Layers of Learning: Using Read-Alouds to Connect Literacy and Caring Conversations*, JoEllen McCarthy (2020) says:

When we use stories to invite complex questions and reflections, we see books as co-teachers that inspire us to wonder, to see possibilities, and to illuminate the truths and sometimes the harsh realities about our world. As we read, our beliefs are affirmed, challenged, strengthened, or changed. (p. xiv)

Inviting conversations through children's literature provides an opportunity to approach complex issues through an empathetic lens and bring abstract terminology to life, rather than regurgitating and memorizing information through rote teaching methods (Hawkman et al., 2022). In this approach, the learning process becomes both interdisciplinary and intergenerational. The literature connects with what students already know and did not know about the world (Hawkman, et al., 2022, p. 13). Along the process, the literature also inspires students to talk about their lives outside of school (Hawkman, et al., 2022, p. 13), which allows teachers to learn more about their students, and students to learn more about the different perspectives their peers have.

Children's literature has also proven to be beneficial to young learners' holistic development. McCarthy (2020) asserts that "the role of literature in our classrooms goes far beyond its effects on academics" (p. xiv) - reading books together and having conversations around books can contribute to the development of children's social-

emotional literacy (McCarthy, 2020; Harper, 2016). Children's literature offers a foundation for nurturing empathy, tolerance, and friendships, and reinforcing social-emotional, problem solving, and conflict resolution skills in young learners (Kemple, 2004, as cited in Harper, 2016, p. 81). Using children's literature in the classroom supports the holistic education of the whole child - engaging in reading can help learners understand more about themselves and the world around them (head), which translates to empathy (heart), which eventually leads to meaningful action (hands) (Thomas Lickona, 1991, as cited in McCarthy, 2020, p. 4). Introducing books that make complex themes accessible to young learners can provide the language for them to express themselves in those topics, which accelerates the development of social-emotional literacy (Harper, 2016, p. 81). Additionally, Talgorn and Ullerup (2023) elaborates that "collaborative storytelling and retelling enable the participants to add their own layers of experience or values to the story, similar to the traditional retelling of stories, and contribute to a communal and appropriated knowledge, [also referred to as] 'storyknowing' (Reason et al., 2016, as cited in Talgorn & Ullerup, 2023). By nurturing an environment that promotes empathy through storytelling, students can enhance their connections with their peers and increase their sense of belonging to their school and broader communities.



Figure 2.1
We are Water Protectors,
by Carole Lindstorm

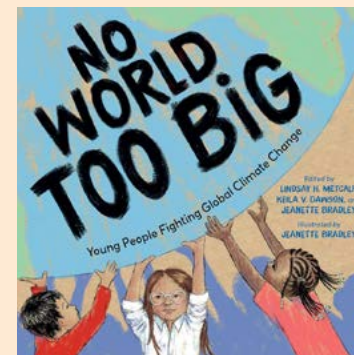


Figure 2.2
No World Too Big, edited by Lindsay
H. Metcalf, Keila V. Dawson, and
Jeanette Bradley

Stories also have the capacity to empower children to become agents of change within their communities. The pressing environmental challenges of our time often evoke negative feelings and eco-anxiety (Schechter et al., 2023), which may prompt individuals to emotionally and cognitively disengage through denial, rejection, and avoidance of the topic (Talgorn & Ullerup, 2023). However, "making the topic closer and personal and associating it with positive emotions, especially hope and empathy, is an important path to inspire and motivate engagement (Talgorn & Ullerup, 2023, p. 20). Carefully-selected children's literature can provide the foundation for empowerment, which McCarthy (2020) describes as:

[the] understanding that each of us has the potential to make a difference in our world and affect the path our lives take ... [it] is about a vision for a better world - one that begins by calling all learners to be part of a more compassionate, caring classroom community" (pp. 140-141).

Children's literature can inspire young learners to participate in global movements of justice, beginning with identifying and addressing challenges within their own communities. By sharing stories and experiences of children in the same age group as students in the classroom rather than adults, students can connect these narratives to their lived experiences in a more direct and tangible way (Hawkman, et al., 2022, p. 15). Additionally, to illustrate this point, some examples of books related to environmental justice include *We are Water Protectors* (2020), written by Carole Lindstorm (figure 2.1) and *No World Too Big* (2021), edited by Lindsay H. Metcalf, Keila V. Dawson, and Jeanette Bradley (figure 2.2).*

We are Water Protectors tells the story of a young Ojibwe girl who takes a stand against an oil pipeline to preserve the water supply of her people. Inspired by Indigenous-led movements across North America, this book centers Indigenous perspectives and voices around environmental protection, encouraging readers to actively engage in safeguarding natural sources within their communities.

No World Too Big compiles stories of twelve young activists and three activist groups across the globe who are actively combating climate change and making a difference in their communities. This book serves as a tribute to celebrate young environmental leaders worldwide, extending an invitation to readers to join the movement and contribute to positive changes in their lives and communities. Children's literature, such as these, holds significant power in showing young learners the potential they have to make a difference in the world and empowers them to do so.

* Refer to Appendix A for a resource guide with picture books about ecology, justice, and resistance, including *We are Water Protectors* and *No World Too Big*.

Not only is storytelling through literature effective for imparting knowledge and facilitating social-emotional learning, participatory storytelling activities, such as story creation and role-playing, also have a strong potential to foster empathy for the natural world in young children. A study by Talgorn and Ullerup (2023) invited participants to co-create environmentally themed stories with human and non-human characters to promote interrelatedness (a sense of relationship with the self, others, and nature). The study highlighted that “storytelling can create strong and intimate bonds between storytellers, listeners, and the natural world” (p. 8), and “story making is known to stimulate multidisciplinary collaboration, idea and emotions sharing, new perspective taking, out-of-the-box thinking, and collective sense making” (p. 2). Through creating stories and designing human and non-human characters, the activity facilitates “active narrative empathy”^{**} (p. 19), perspective-taking and engagement with environments and experiences that are unknown or inaccessible (Talgorn & Ullerup, 2023). To put it simply, “stories make familiar the unfamiliar” (Bernaerts et al., 2014, as cited in Talgorn & Ullerup, 2023, p. 5).

Storytelling has consistently served as a foundational tool in many cultures, connecting people to the past, present, and future by facilitating the sharing of knowledge, sustaining cultural heritage, inspiring positive action, and more. Research shows that “environmental narratives can stimulate pro-environmental engagement by communication and making easy to remember facts, but also by shaping beliefs and co-constructing meaning in new relationships with each other and with the world” (Talgorn & Ullerup, 2023, p. 5). Children’s literature is easily accessible and provides schools and families with valuable resources to introduce children to complex topics like climate change and environmental justice, opening

doors to inspire active engagement with their immediate communities. Additionally, shifting from a storyteller-receiver approach to engaging children in participatory storytelling can further facilitate a sense of connection to the natural world. Participatory storytelling encourages active dialogues, exploration of various narratives, as well as student choice and agency in developing their individual and collective narratives (Talgorn & Ullerup, 2023). However, while storytelling is proven to have short-term impact on beliefs, concerns, and attitudes towards environmental issues, it is limited in influencing behavior (Talgorn & Ullerup, 2023). It is suggested that storytelling should be coupled with other strategies that “develop [students’] understanding of tangible and accessible ways to act, of the specific outcome of individual actions, and of the link between individual and collective action” (Talgorn & Ullerup, 2023, p. 23). Additionally, it is also important to find a balance between encouraging creative expression while grounding stories in factual knowledge (real experiences, scientific information, Indigenous knowledge, etc.) to prevent reinforcing anthropocentric bias and building “false empathy”^{***} (Talgorn & Ullerup, 2023, pp. 6, 23).

^{***} “False empathy” refers to “the incorrect projection of personal experiences and the incorrect belief that one feels the suffering of another without cognitively understanding the other” (Young et al., 2018; Nanson, 2021, Keen, 2007).

^{**} “Narrative empathy” refers to “the imaginative process whereby readers temporarily adopt the perceptual, emotional, or axiological perspective of a fictional character” (Keen, 2007, as cited in Talgorn & Ullerup, 2023, p. 5-6) as receivers of the story. “active narrative empathy” refers to the active participation and practice of “narrative empathy”.

Art + Environmental Education Frameworks



Traditionally, environmental education primarily focuses on science education, often feels distant and abstract, and frequently overlooks the environmental challenges confronting local communities, especially marginalized groups (Bertling, 2023). A study (Bertling & Moore, 2021a, 2021b, as cited in Bertling, 2023) among 3,000 art educators in the United States indicates that among ten common educational approaches in art education, visual and material culture, multicultural education, and interdisciplinary education were among the most emphasized approaches, while ecological or environmental education was the least emphasized. Despite this, the same educators acknowledge the importance of implementing ecological or environmental art pedagogies in their classrooms. Many noted that children are interested and motivated to make a difference, and believe that the art room provides a safe space to explore and emphasize these issues.

Bertling (2023) notes that since the 1970s, with the rise of environmental education, eco-art, and environmental politics, there have been several developments of art education models that integrate ideas about the environment such as eco-art education (Inwood, 2008), critical place-based art education (Bertling, 2015; Graham, 2007), *Earth* education (Anderson & Suominen Guyas, 2012), arts-based environmental education (van Boeckel, 2015), and ecopedagogy (Bertling, 2023). Along with those are educational models that incorporate environmental education such as outdoor education, slow pedagogy, critical place-based education, and ecojustice. For example, among many other examples, the Reggio Emilia approach and forest schooling investigate the possibilities of expanding the art curriculum beyond the four walls of the classroom. These models explore the potential of bringing students out to explore nature or integrating nature into the classroom to cultivate a harmonious connection with the natural world. By nurturing such relationships from an early age, there is a greater likelihood that students will sustain these connections as they grow older.

In 'Rethink, Reimagine, Reinvent: The Reggio Emilia Approach to Incorporating Reclaimed Materials in Children's Artworks', Eckhoff and Spearman (2009) explore the impacts of incorporating found or reclaimed materials, such as natural materials, plastic packaging, textiles, and scrap paper, into elementary art education. "The Reggio Emilia approach stresses the relationship between children and the environment, collaborative learning, and inquiry-centered projects" (Edwards, Gandini, & Forman, 1998, as cited in Eckhoff & Spearman, 2009, p. 10). This approach promotes sustainable arts practices through expanding students' language of materials, by encouraging them to see these waste materials in a new light and engage them with the process of reinvention and meaning-making. Incorporating these materials into art education can also serve as a starting point for discussions with young learners about the relationship between art, culture, and other fields, fostering a connection between school and community (p. 12). Found materials have a cultural-historical nature and young learners can benefit from asking questions that investigate the object's construction, function, and cultural or historical context before they think about how to transform it into something new (p. 14). Exploring these materials can also spark conversations about more complex topics such as environmental justice and encourage thought about sustainable art practices for future projects.

Natural materials	leaves, small tree branches, pine cones, sea shells, small rocks, sand
Paper	cardboard, corrugated cardboard, Tetra Pak cardboard, wrapping paper, boxes, office pack, news print
Metal	copper, aluminum, aluminum foil, metal wire, florist wire, plates, chains, pipes, drawer knobs, mesh, miscellaneous hardware
Wood	planks, blocks, cork, plywood, wicker, balsa wood strips, popsicle sticks
Cordage	rope of various sizes, laces, jute, colored string
Leather	leather pieces, leather cords
Glass	mirrors, Plexiglas, containers, pendants, balls, polycarbonates (also in colors), bevels
Textiles	apparel, accessories, yarns, bobbins, color swatches, terry cloth
Haberdashery	costume jewelry, buttons, buckles, zippers, ribbon, elastic, lace
Materials with textured surface	soundproofing material, foam coverings, carpet samples, sand paper, upholstery
Plastic	tubes, boxes, bubble wrap, funnels, springs, transparent coils, lids, containers, circuit holders, press scraps, printed circuit boards, photographic film canisters, slide trays, bevels
Marble	cut for mosaics and in small slabs, stones, tiles
Rubber	stoppers, bands
Food containers	plastic, foamed polyurethane, glass, paper take-out
Bottles	plastic, glass
Films	silk-screen, photographic
Polystyrene	food packaging, packing peanuts
Miscellaneous materials	clay, modeling materials, colored sand

Figure 2.3
Examples of reclaimed and/or recycled materials that can be used in art projects (Eckhoff and Spearman, 2009, p. 13)

On the flip side, young people can also benefit from learning beyond the traditional classroom setting. In the article 'Natural Connections: Forest Schools, Art Education, and Playful Practices', Bradshaw (2018) delves into the outcomes of forest schooling, an educational model that centers the environment as a foundation and guide for learning. Within the pedagogical framework of forest schooling, students are encouraged to freely explore, observe, play, and experience outdoors organically through unstructured time. Teachers play a facilitative role, fostering a safe environment for students to embrace adventure and risk while allowing them to create their own learning experiences independently. According to Bradshaw, the environment is considered the "third teacher" (p. 32) in forest schooling. When placed in an outdoor setting, students encounter a new learning environment that can create different educational outcomes by exposing them to "new and dynamic artifacts for them to draw inspiration from" (p. 32). This educational model is applicable to various types of learning environments, not just schools in close proximity to forests or other natural environments. The fundamental concept is to empower students to explore, comprehend, and take inspiration from their surroundings through play, using art as a connection between "their world, their skills and knowledge, and their present and future learning" (p. 33). Conducting classes outdoors also allows students to investigate materials and objects that spark their interest within a contextual setting. They are prompted to look at the natural, built, and discarded objects they find in a different way. These outdoor explorations may, in turn, cultivate an interest in participating in collaborative design challenges that tackle issues within their local communities. Bradshaw asserts the importance of "presenting art classrooms as communities: places where people can learn independently, but also where they can come together to problem solve, practice, and make organically" (p. 33).

Inwood and Sharpe (2018) explore these ideas in their article, "Growing a Garden-Based Approach to Art Education," demonstrating that incorporating concepts from forest schooling or place-based education can take place within the school grounds. A growing number of art educators are exploring the potential of their own school gardens as a learning space beyond the confines of a conventional classroom (p. 43). This approach offers numerous benefits, including actively engaging and involving students as well as an aesthetically improved educational environment which can serve as a catalyst for more creative endeavors. Using the school premise as an exploration site also offers opportunities for multidisciplinary learning, connecting the arts to other subjects such as science, and getting students involved with ecological issues at a small scale. School gardens can act as a site for students and teachers to work together to come up with simple solutions that mirror the "big ideas" of nature, environment, community, and sustainability through artmaking (p. 44). An example used in the article included art projects done at Runnymede Public School in Toronto, Canada that Inwood did with kindergarten to grade 8 students. Through getting students involved with environmental issues in their school, they "learned that they could bring about positive environmental change on a local level" (p. 45). Over time, students started to use artmaking intentionally as an age-appropriate form of environmental activism (Inwood, 2010, as cited in Inwood & Sharpe, 2018, p. 46), which then increased the school community's interest in the importance of environmental education. "When children create art in nature they have personal, meaningful experiences that can affect their lifelong relationships with the earth" (p. 48). Art education can be meaningful when what the art students make comes to life, allowing them to recognize how it connects with their world. By actively engaging them with problem-solving within their school and including them in decision-making processes to enhance their school, students also demonstrate improved overall performance (p. 44).

Dr. Joy Bertling (2023) recently introduced a new framework for merging art and environmental education, ecopedagogy, which she defines as a “critical environmental pedagogy that seeks to transform social, cultural, economic, and political structures to construct a more just and sustainable society while acknowledging that this process will always be incomplete” (p. 9). Ecopedagogy is grounded in critical frameworks promoting social, ecological, and climate justice, while asserting the inseparability of social and ecological problems (Bertling, 2023). Central to ecopedagogy is nurturing relationships and fostering empathetic connections with the natural world:

As art educators, we might ask ourselves how students’ empathetic awe- and wonder-filled experiences and understandings of ethical relationality with the land can be fostered through art education. How can students connect with organisms and life worlds seemingly different from their own? How can students find affinities with rocks, rivers, and mountains? How can the intellectual distance between human and non-human dissolve and kinship become clearer? In many ways, [art] may be uniquely suited for cultivating these relations. (pp. 41-42)

Ecopedagogy seeks to bring together various educational, environmental, and cultural philosophies, including ecofeminism and deep ecology, as well as existing art and environmental education approaches (Bertling, 2023). She also highlights that ecopedagogy intersects and is compatible with other common approaches of art education such as social justice, multicultural, community-based, critical place-based, and choice-based art education, visual and material culture studies, as well as design education and STEAM (Bertling & Moore, 2021b, as cited in Bertling, 2023). Ecopedagogy manifests across diverse approaches and traditions of art education, including the integration of theme-based learning in choice-based art education, an inquiry-based strategies in arts-based

research, or a problem-based approach in design and STEAM education (Bertling, 2023). Student collaboration and choice is emphasized as a key aspect of ecopedagogy as they foster motivation and collective action (Bertling, 2023). Examples of practical implementations of ecopedagogy in the art classroom include studying and making eco-art, prioritizing sustainability in studio art practice, weaving ecological and environmental themes into the curriculum, and conducting lessons outdoors (Bertling, 2023).

These different educational approaches underscore the transformative potential of art in nurturing relationships and fostering empathy for the natural world among young learners. Through mindful use of materials, engaging with outdoor learning environments, integration of environmental themes, and creating artwork that supports or reflects environmental concerns within local communities, art classrooms can become a safe space for meaningful conversations and activities centered around ecological themes. While assessing long-term impacts may pose challenges, these initiatives represent a valuable starting point in cultivating ecoliteracy, potentially leading to future attitudes and behaviors of care towards the natural world.



CHAPTER 3:

Germination

Research Methodology

In this study, I engaged in mixed-methods qualitative research to explore several strategies aimed at cultivating empathy for the natural world to promote ecoliteracy among children in the classroom, as discussed previously. I primarily conducted action research through my work with Mini Makerz Art Studio and Creature Conserve. Within these settings, I gained practical experience in the classroom and integrated my research topic into the art lessons I developed and taught during weekend and after-school classes for elementary-level students. Additionally I conducted interviews with professionals from diverse fields and backgrounds to gain insights about how from their experiences of working at the intersection of art, environment, and education.

Action research refers to “a field-based systematic inquiry aiming toward change in practice and where reflection on practice is embedded in all phases of the research process” (Klein, 2014, p. 44). In essence, it can be understood as a genre of “practitioner inquiry” (Cochran-Smith & Lytle, 2009) that follows a cycle that begins with identifying a problem or need, develop inquiry questions and methods, collect and analyze data, and take action based on the findings (Klein, 2014; Cochran-Smith & Lytle, 2009). Action research offers a pathway for evaluating one’s teaching practice and innovating ways to teach art through a constant process of reflection (Klein, 2014). This means that as the teacher/practitioner, I also assume the role of the researcher in this study (Cochran-Smith & Lytle, 2009).

My research method was an iterative process that involved crafting lesson plans, implementing them into a workshop or lesson, and reflecting on and revising the plans for the subsequent lesson based on my observations and reflections of the student’s engagement with the topic or activity. I also sought feedback from the students to find out what interested them and how I might make the next lesson more engaging and impactful.



My overall goal was to contribute to their understanding and empathy towards the natural world. Engaging in this form of research allowed me to generate knowledge through personal experience and reflection, and contributing to public knowledge by making it accessible and usable in other contexts (Cochran-Smith & Lytle, 2009). The reciprocal relationship between research and practice in action research offers a potential to rethink and restructure the ways that we think about education and challenge the status quo (Cochran-Smith & Lytle, 2009).

The primary objective of the lessons I designed and conducted was to observe my students' existing knowledge perceptions of the natural world, including biodiversity, ecosystems, and global environmental issues. I sought to understand how the students absorb and interpret the information presented to them, and investigate how this newfound understanding manifests in their artwork. While the act of creating art is integral to the research process, it was not the sole focus of my research. Instead, art served as a medium through which students can engage with empathy for the planet through creative expression. The topics and activities I developed in my lesson plans can be interchangeable with other activities and adapted to different groups of students, as long as they share the same strategy to nurture empathy, such as storytelling.

In addition, I also conducted qualitative interviews with professionals in various fields connected through their shared interest in art, science, conservation, sustainability, environment, and education. I engaged in informal open-ended interviews to get to know about the participants' experiences and allow them to share their insights and knowledge on these topics (Bhattacharya, 2017). These interviews act as windows to other perspectives (Davenport & O'Connor, 2014), especially from those who are much more experienced than I am, offering a glimpse into the diverse pathways through which empathy for the natural world can be nurtured.



Scope and Limitations

Time constraint presents a big challenge for my research. In my pursuit of developing an educational model that is adaptable to diverse communities, I need to understand the unique challenges and needs of different communities to propose effective alternatives and accommodations. However, given this limitation, I may not be able to fully embrace a broad range of perspectives and may have to restrict my focus to those I am already familiar with. This inevitably means that my exploration will be narrowed to one or two focal topics, such as human relationships with animals and plants. Other topics I wish to explore but might not have the capacity to delve into within this thesis include engaging with environmental justice issues through art education, tackling local environmental challenges through art projects, and so forth.

With the limited time, I was also unable to conduct lessons for a diverse range of age groups as I had originally intended. Consequently, I had to narrow my research focus to students at the elementary level. This limitation may result in missing out on insights that could have been gained from working with older students, who likely possess a broader understanding and more nuanced opinions about the climate and our relationship with the natural world. Additionally, older students tend to demonstrate greater independence and maturity in their thinking, emotional literacy, and problem-solving skills, potentially leading to different research outcomes. Moreover, it would also be more feasible to engage in discussions about specific challenges within their communities and center the activity around devising solutions to those issues.

I had also aspired to collaboratively design lessons with students to tailor them to their specific interests and community needs. However, due to the challenges I mentioned before, along with the nature of community-based programs, this might prove to be difficult as there might be different students attending each session throughout the semester. Given the brevity of my master's program, which spans only one academic year, I have limited opportunities to work with students extensively. Consequently, this idea would have been better suited for a project or research endeavor that involves the same group of participants over a longer period of time.

Some ethical considerations for this research include the necessity for obtaining consent and assent when documenting my teaching experiences, which includes images of student artwork and their creative process. To uphold anonymity and confidentiality, the personal information of participants, including their names and images, has been omitted in this research. However, certain details such as their age have been retained to provide deeper insights to the potential capabilities of students within that age group. Given that the students I worked with lack the legal capacity to provide consent, obtaining assent from them along with consent from their adult guardians is essential prior to commencing the art activities. Despite these constraints, this thesis aims to build upon predecessors and lays the groundwork for future research endeavors to continue to strive to enhance the visibility and accessibility of environment-centered art education for diverse audiences.

In Conversation With:

Throughout my research journey, I had the privilege of engaging in insightful conversations with a diverse group of professionals, including artists, writers, and educators, whose work intersects with the topics of social and environmental justice. These practitioners offered unique perspectives and invaluable insights drawn from their experiences, strategies, and philosophies aimed at addressing pressing social and environmental challenges together with their communities. Each conversation not only enriched my understanding of the integration of art and environmental education but also played a pivotal role in shaping the trajectory of my research. In this section, I will highlight the multifaceted approaches that these individuals have taken to engage students and community members in social and climate justice work through artistic expression and educational initiatives. A recurring theme in these discussions is that their experiences underscore the significance of empathy, ecoliteracy, and an interdisciplinary perspective as fundamental pillars that empower them to create meaningful change within their own communities.



Dr. Mona Damluji



I think that there's so much space, in terms of children's literature, for a serious engagement with environmental justice and centering underrepresented perspectives.

Dr. Mona Damluji is an Assistant Professor of Film & Media Studies at the University of California, Santa Barbara, where she writes, studies, curates, and teaches about oil culture, cinema history, and the Middle East. Mona has also authored a children's book, *Together* (2021), in collaboration with illustrator Innosanto Nagara, who wrote and illustrated the bestseller *A is for Activist* (2012). I approached her intending to learn more about her inspiration and process for writing *Together*.*

Mona has always been a writer and enjoys creative writing and poetry. The story of *Together* was inspired by her good friend, Ady Barkan, who was one of America's most important activists around Medicare for All. Mona recounted the time when Ady was giving speeches on a bus tour across the country before he lost the ability to speak due to the terminal neurodegenerative disease, ALS, that he was diagnosed with. With his voice that was getting weaker, Ady said in his speech, "Speaking alone my voice is weak. But when we come together, our voices echo so loud." (M. Damluji, personal communication, October 20, 2023). Mona found inspiration and strength in this simple and universal message that we are stronger together.

A lot of my motivation was that I wanted to uplift and amplify the work that Ady was doing. Other than showing up to protests, I see writing as an act of solidarity work that came to me very quickly. (M. Damluji, personal communication, October 20, 2023)

Over the years of engaging with social justice work, she has built and deepened her relationships with other activists, some of whom have published children's books, including Innosanto Nagara. She had a growing interest in children's literature and had been talking to Innosanto about writing children's books for a long time. When she had come up with the draft of *Together*, she sent it to Innosanto and asked if he would illustrate it. At the time, Innosanto had published two board books, *A is for Activist* (2012) and *Counting on Community* (2015), and had been trying

* Refer to **Appendix A** for a resource guide with picture books about ecology, justice, and resistance, including *Together*.

to come up with a third board book.** Their friendship opened up a door to an opportunity for collaboration to make *Together* a reality.

The process of creating this book was a rather unconventional one as writers and illustrators are usually working independently with the publisher as the middleman. However, because they went into this project with an already-established relationship, they were able to be involved together in the whole process. *Together* features a simple yet empowering message of finding strength in community, yet when the text is paired with the images, it gestures to the complexities and multifaceted aspect of social justice issues and representation of diverse communities (figure 3.1).

“There was a lot that I was trying to say in the poem that isn’t in the words themselves... the images add all these layers of environmental consciousness, the struggle for Black liberation, Palestinian liberation (and more). All these things are all woven in there.” (M. Damluji, personal communication, October 20, 2023)

Stories like *Together* are part of an important narrative tapestry that serves to educate and empower both children and the adults who read with them. By weaving themes of cooperation, resilience, and collective action, *Together* inspires hope through examples of communities coming together to create positive change. By portraying diverse communities and species, it highlights the profound interconnectedness and interdependence of all life forms, fostering empathy for both people and the planet. *Together* serves as a reminder that in facing the challenges of climate change and social injustice, solidarity and compassion offer pathways to a hopeful future. Storytelling emerges as a powerful tool for building empathy and motivating meaningful action. Thus, there is a pressing need for more stories that address these issues.

** He has also authored, illustrated, and contributed to numerous picture books around the themes of social justice and resistance

“I think that there’s so much space, in terms of children’s literature, for a serious engagement with environmental justice and centering underrepresented perspectives. There’s a lot to be done.” (M. Damluji, personal communication, October 20, 2023)

A few weeks after I had this conversation with Mona, there was news of Ady Barkan’s passing due to complications of ALS. While he is no longer with us, his profound message will continue to live on through various avenues, including *Mona’s* book *Together*. His legacy will persist and continue to sow seeds of inspiration and empowerment for current and future generations.

Learn more about *Mona’s* work on her website, www.monadamluji.com.



Figure 3.1
Spreads from *Together* by Mona Damluji, illustrated by Innosanto Nagara

Dr. Lucy Spelman



The language of science is complicated and technical ... art [makes] the material more accessible, interesting, and relevant.

Dr. Lucy Spelman is a zoological medicine veterinarian, educator, and founder of Creature Conserve, a non-profit organization dedicated to combining art with science to cultivate new pathways for wildlife conservation. Currently, she is the Exotics Specialist at Ocean State Veterinary Specialists where she treats a variety of patients including birds, reptiles, amphibians, and small mammals. She is also in her 13th year as part-time faculty at RISD, where she has developed and taught or co-taught various art/science courses such as Biology of Human-Animal Interactions, Evolutionary Biology, Art of Communicating Science, Comparative Anatomy, Living Systems Lab, Visual Stories of Natural Histories, as well as RISD Global Studies courses in Guyana, South Africa, and Hawaii. Additionally, Dr. Lucy has worked as a zoo veterinarian, a zoo director, a wildlife veterinarian, a media consultant, and a writer. She has not only written various scientific articles, but she is also the author of the *National Geographic Kids’ Animal Encyclopedia* (2012) and co-editor of *The Rhino with Glue-on Shoes* (2008), an anthology of short stories. Her newest book is *Creature Needs: Writers Respond to the Science of Animal Conservation* (publication date November 2024) co-edited with poet Christopher Kondrich and writer Susan Tacent.

I first met Dr. Lucy in the Junior year of my undergraduate studies, when I took her class on the biology of human-animal interactions. Since then, I have taken another class as well as a RISD Global course with her. Dr. Lucy played a pivotal role in the development of my interest in integrating art and science, and has been a wonderful mentor to me in the past few years, and especially through this thesis project and internship. Curious about what led her to start Creature Conserve, I asked her about her journey of how she began to bring art and science together.

The idea started when I was working with mountain gorillas. The non-profit I was working for had adopted a “one-health” strategy for the conservation of this species. It was clear that the health of the gorillas depended on that of the people who lived next to their nature reserve as well as those who visited them daily as a result of ecotourism. The money generated by tourism was paying for their protection and also helping pay for the needs of the human community. It was clear to me that to keep the gorillas healthy, we needed to work with local experts in human health as well as other aspects of society. The team I worked with understood this was important and we tried and did make connections, – but it was still just us. I could see how we could reach a wider audience and have a greater impact if we brought in more perspectives from practitioners in various fields. (L. Spelman, personal communication, March 31, 2024)

She started asking herself this question on a daily basis, “How do we get more people from diverse backgrounds involved in wildlife conservation?” Many people care about animals, but few are active in conservation projects. From a young age, she had always been interested in animals and understood that we are all animals. We are all connected and are working towards the same goals: finding air, food, water, shelter, room to move, and each other. If other animals are in trouble, then we are also in trouble. It works the other way, too. If we help one species, we help another. As she grappled with that question, her journey led her to her career as an educator. She said:

I want to work in a place where I could learn from experts in other fields and share my expertise. I wanted to be in a place with people who know more than me about most things and who would be interested in my experiences as a scientist and conservationist. (L. Spelman, personal communication, March 31, 2024)

In 2009, she taught at Brown University, her alma mater, as a Visiting Assistant Professor to instruct a class on the biology of human-animal interactions. Since then, she has moved on to teach biology to art and design students at RISD as a part-time faculty.

The language of science is complicated and technical. As a result, it appeals to relatively few people. During my first semester teaching at RISD, I noticed that my students were exceptionally– even naturally–good at finding the science that interested them. They used their art as a filter of sorts. The result was artwork informed by the science. Some of it communicated the science, but most of it was prompted or inspired by it, and that was exciting because their art made the material more accessible, interesting, and relevant (L. Spelman, personal communication, March 31, 2024)

In a 2015 TEDx talk delivered in Providence, RI, Dr. Lucy talks about her journey and experience of collaborating with students and professors at RISD and how now she sees that wildlife conservation is part art and part science.

If you can bring somebody up close and show them the creature, they feel the same concern or curiosity or compassion, but you can't do that over and over again. Certainly, there [are] not enough of us working on [wild] animals [nor are there enough animals in the world to make this type of] up-close [and personal experience possible for] 8 billion people. (TEDx Talks, 2015, 5:20)*

This is where we need to go: bringing art and science together to explore what's happening to animals, and what can we do about it. What [will] motivate us to take action is [when] we truly understand what is happening, and we truly understand that there are solutions. (TEDx Talks, 2015, 14:05)*

* I shared my thesis with the people I am in conversation with in this section. During her read through, Dr. Lucy made some revisions for clarity indicated by the brackets.

Creature Conserve started as a website to showcase and make accessible the work that RISD students made in Dr. Lucy's classes. After being invited to give a TEDx talk about her art-science work, she realized that Creature Conserve could become a non-profit:

“What if it was a non-profit? What if I tried to raise money for artists so they could gain experiences across different disciplines? It would not have to be limited to students but we could start there.” (L. Spelman, personal communication, March 31, 2024)

Over time, working together with a team of scientists, artists, designers, curators, and other practitioners, Creature Conserve has developed into a non-profit outreach organization that offers a myriad of programs. Recently, Creature Conserve has revised its mission statement to be more specific: It is dedicated to growing a creative community that combines art with science to cultivate new pathways for wildlife conservation¹.

“The question I have been asking myself for nearly 20 years, ‘How do we get more people involved in wildlife conservation?’, has evolved to, ‘How do we encourage people from all walks of life to contribute their skills and their knowledge so we can live in balance with wild animals and their habitats?’ So, going forward at Creature Conserve, we are focused on making the pathways we support visible to different people—to artists, designers, writers, scientists, traditional knowledge holders, other experts, students, and the general public—to make it easier for them to get involved or take action.” (L. Spelman, personal communication, March 31, 2024)

The programs offered by Creature Conserve take shape in the form of workshops, scholarships, mentorships, and exhibit curation.

- Skill-based workshops unite artists, designers, writers, and scientists together around a theme related to wildlife conservation, equipping participants with tools to make conservation science more accessible and impactful. For instance, some workshops focus on teaching participants how to find scientific papers or how to kickstart their writing projects. Professional development workshops explore diverse career paths where art and science intersect, showing examples of how different people have gotten involved and combined art and science in their work and providing example pathways that can inspire them in their own work.
- Scholarship stipends are, in essence, ‘seed money’ to provide financial support for creative projects that merge art and science in the context of wildlife conservation. Applicants propose either existing or new projects to serve as the focus of their exploration.
- The mentorship program pairs participants from around the globe with experienced Creature Conserve mentors, who offer guidance and support throughout their project development. These mentors, established in art-science wildlife conservation, nurture relationships with mentees, helping them to recognize the connections between art and science in their work.
- Curatorial programs provide artists and curators opportunities to curate exhibits and public programs that showcase work that combines art and science. Through initiatives like the “Re-Conservation” exhibition series, Creature Conserve celebrates creatives worldwide who integrate art, science, and ecological knowledge to study and protect wildlife.

Rooted in values such as curiosity, creativity, empathy, equity, inclusivity, positivity, and reciprocity, Creature Conserve's programs strive to foster collaboration. These initiatives form an orbit that provides pathways for individuals to get involved, cultivating a supportive environment that empowers practitioners across diverse fields to grow as individuals and inspire broader engagement.

The reason artists and scientists share their work are different, but we are all trying to figure out what is going on in the natural world around us. Science alone doesn't motivate us to act. Art is more likely to inspire action because it taps into our emotions, it's more accessible and more understandable. (L. Spelman, personal communication, March 31, 2024)

Since its beginning in 2015, Creature Conserve has brought together individuals from various disciplines across the globe, fostering opportunities among like-minded people and resulting in impactful work for wildlife conservation. Below are testimonials of recent scholars, Liz Bateman and Lee Fearnside, on their experience working with Creature Conserve:**

** To read more about the experiences of other Creature Conserve scholarship alumni, please visit <https://creatureconserve.com/scholarship-alumni>

LIZ BATEMAN
 Art+Sci Research Scholarship Recipient
Illustrating Nova Scotia's Imperiled Native Minnows

After working in fisheries biology for several years, I discovered a lack of information and visual identification materials available for minnow species in my province, so I wanted to create illustrations of every native species to help watershed groups and other biologists identify them in the field but also to call attention to the fact that these overlooked fish species are under threat of predatory invasive species and changing environmental conditions. I wrote many grant applications but no funding organizations would support me as my project was artbased rather than field or lab research. Thankfully, Creature Conserve bridged that gap between art and science and saw the value in my project proposal and those of many others all around the world. This has been such a positive experience and I hope to stay connected with Creature Conserve and the community around it even after my scholarship project is complete.




Figure 3.2
 Creature Conserve scholar testimonial: Liz Bateman (Creature Conserve, 2024)

LEE FEARNSIDE
 Mentor Support Scholarship Recipient
Oak Openings

In this project, I especially enjoyed the aesthetic discussions with [my collaborator, scientific illustrator] Domenic Pennetta, figuring out how to combine two distinct mediums, and conversations with local conservationists and park officials about how to create chance encounters that encourage new ways to think about conservation. My original concepts changed and shifted through these conversations - the true beauty of collaboration is in that process. I am grateful to Creature Conserve not only for the financial support of this project, but for building community, as I met Domenic through a Creature Conserve workshop.




Figure 3.3
 Creature Conserve scholar testimonial: Lee Fearnside (Creature Conserve, 2024)

Dr. Lucy's journey exemplifies the transformative potential of bridging art and science to engage people intellectually and emotionally, inspiring action in wildlife conservation. Her impactful work illuminates the profound connection between these disciplines, fostering a supportive environment for practitioners from diverse backgrounds to come together and explore new pathways for art-science collaborations. As an educator, she demonstrates how art-science education empowers students to cultivate empathy, compassion, and understanding for other species through creative expression.

Learn more about Dr. Lucy's work on her website, www.drLucySpelman.com and visit Creature Conserve's website at www.creatureconserve.com to explore their programs.



Hope Ginsburg



I want to empower the students to make artwork from a place of their own genuine curiosity.

Hope Ginsburg is an artist and professor in the Department of Kinetic Imaging at Virginia Commonwealth University School of the Arts. She is renowned for her interdisciplinary approach that intertwines video, performance, and social practice. Her body of work encompasses several long-term projects that blend artistic expression with research, knowledge exchange, reflection, and meditation, exploring our relationship with the natural world and the changing climate. Her notable projects include *Meditation Ocean*, *Land Dive Team*, and *Sponge*. Through her work, she invites audiences and collaborators to engage with pressing environmental issues and contemplate the interconnectedness of all living beings.

From an early age, Hope has always been fascinated by nature. She fondly recalls moments from as early as kindergarten when she would collect and examine dead bees that she found, or pull worms out of the mud after it rained. Her interest in bees grew through visits to the Schuylkill Valley Nature Center, where there was an observation hive. Even as a child, she felt a deep connection to the natural world and viewed things that were often considered scary or disgusting with a sense of curiosity and wonder. In high school, she got involved with the Students for Environmental Action Group where she worked on projects to promote environmental awareness and action. After completing her Bachelor's in Fine Arts at Tyler School of Art, she began a deeper investigation into bees at Skowhegan, an artist residency in central Maine, where she apprenticed with a beekeeper in the summer of 1997. She built up antibodies to withstand bee venom, enabling her to perform daring feats like wearing a bee beard (figure 3.4). From her early days as an artist, her fascination with ecology and learning about other species remained central, gradually intertwining with her growing awareness of the climate crisis and the pressing urgency of addressing it.

I was interested in a kind of ecological thinking, or ecosystem thinking, even in terms of being an artist that's very interested in how art and everyday life fit together. To me, that was also an ecology. (H. Ginsburg, personal communication, April 1, 2024)

Becoming an educator was a somewhat unexpected shift in Hope's career trajectory. Prior to stepping into the role of a professor, she had been doing environmental work in the textile industry such as product development and marketing. However, as she pursued her graduate studies at the Massachusetts Institute of Technology, she found herself grappling with the direction she wanted her art practice to take. Reflecting on her impactful experiences while working in industry, she saw them as a model for shaping her art practice. That was when she started to explore the idea of a "mini school within a school", building on the process of knowledge transfer and relationships between experts and learners. This approach resonated deeply with how she was thinking about art and life, and it paved the way for opportunities to teach, or as Hope would refer to as "learning together." Through this, she began to see how the conceptual frameworks of her practice began to take shape and come to life. She took this idea and developed an art and education project called *Sponge* (2006-2016), which inspired her to start applying for teaching jobs.

As of today, Hope has dedicated nearly 20 years to teaching students. She sees teaching as a kind of collaborative work that facilitates knowledge exchange and she often blurs the lines between the expert and the learner in the classroom. For example, Hope spearheaded a *Sponge* project called *Colablalab* (2010-2011) (figure 3.5), where she enrolled in a biology class to learn alongside her students. Essentially, it was a class within a class. As they engaged with the class material, the students independently created their own responsive work based on their collective learning experience. Similarly, the class that Hope is currently teaching is engaging with material from *TBA 21 Academy*, an arts organization that focuses on the intersection of conservation, activism, and art. *TBA 21* has developed numerous resources, including *Ocean Archive*, an online platform and community that facilitates storytelling and collaboration, and *Ocean / Uni*, a free online curriculum offered each semester to provide access to explorations of the oceans.* Their Spring 2024

* Visit <https://tba21.org/> and <https://ocean-archive.org/> to learn more.

curriculum is titled *Pacific Resistance*, and it is focused on exploring interisland solidarity, activism, and resistance strategies in the Pacific.

When the students and I are watching these sessions of *Ocean / Uni*, I'm not in a traditional spot - I don't have any more expertise about this than they do. And so we have to pause, and Google and figure things out together, and then keep going. That is a really exciting way to teach and learn. And it's totally connected to the kinds of exchange and dialogue I like to have in my practice. A lot of what I know about collaboration from being an artist applies in the classroom. (H. Ginsburg, personal communication, April 1, 2024)

Much of what motivates Hope's practice and what she wishes to impart to her students is the importance of curiosity. She believes that curiosity is a motivator for making art, and in turn, making art is an engaged way of learning to sustain attention to what she is curious about.



Figure 3.4
Bearded Lady (1998-2000), Hope Ginsburg, photo by Carol Sinozich
<https://www.hopeginsburg.com/selected-archive/bearded-lady--1998-2000>

I want to empower the students to make artwork from a place of their own genuine curiosity. And I want them to not have assumptions about what is appropriate subject matter for art making, or what is appropriate material to use to make art. One of the most important things to me is that they connect with what is really an intuitive and energized 'yes' for them to move forward with something. I think that one of the biggest things about being an artist is to catch that wave of motivation and excitement. You have to learn how to listen for it and then honor it. (H. Ginsburg, personal communication, April 1, 2024)

As an educator, one of Hope's primary objectives is to nurture a learning environment characterized by a productive, supportive, empathetic, and vulnerable classroom where students feel comfortable and seen. Even when students are not explicitly working collaboratively, she strives to create a space that fosters trust where students can take risks, engage in meaningful dialogue,



Figure 3.5
Colablalab booth in Science Fair Exhibition (2010), Hope Ginsburg
<https://www.hopeginsburg.com/long-term-projects/sponge--2006-2016/colablalab-2010-2011>

and offer support to one another, without fear of criticism or judgment. Central to this process of building trust in the classroom is recognizing that everyone is human.

Hope introduced me to Narrative 4,** an organization that developed a storytelling model designed to empower educators and leaders to facilitate empathy and connection through the exchange of personal narratives. Having undergone training as a facilitator, she has implemented this model in her current classes and witnessed its positive impact in cultivating empathetic collaboration among students. One of her students, Taylor Moorman, wrote and shared a reflection of their experience in the class on Ocean comm/uni/ty, an online social networking platform of the TBA 21 program:

... We absorb knowledge and attempt to make sense of it together, as fish do in their schools. At the same time, we are absorbing each other - our respective knowledge, experiences, quirks, thoughts, and ideas - that create our singular ecosystem. This has happened since first-day introductions, in everyday discussions, and most recently in a deeply generative story exchange workshop ... (Moorman, 2024)

This conversation reminded me of a similar experience in a class that I participated in last semester: we were tasked with a group project to practice some of the activities outlined in *Undrowned: Black Feminist Lessons from Marine Mammals* (2020) by Alexis Pauline Gumbs, and record a podcast reflecting on our experience. Through this exercise, my group members and I connected through reflecting on the reading and relating it to our personal experiences. Prior to this project, I had very minimal interactions with my classmates. However, the opportunity to share our stories with one another created a sense of camaraderie, breaking down the barriers of anonymity and fostering deeper connections both among ourselves and with the course material, which I found very meaningful.

** Visit <https://narrative4.com/story-exchange/> to learn more.



Figure 3.6
Meditation Ocean (2023-ongoing), Hope Ginsburg,
photo by Stephen Takacs
<https://www.hopeginsburg.com/long-term-projects/meditation-ocean--2023-ongoing/m-o--turtlegrass-meadow--2023>

Going back to Hope's work as an artist, I asked her how she envisions or hopes viewers would engage with her work and what they would take away from it. Meditation Ocean, an on-going project exploring human and more-than-human well-being through oceanic meditation (figure 3.6). As part of this project, Hope has launched an exhibition that transformed the space into an accessible "indoor ocean" through a six-channel video installation that facilitates meditation as well as public programming connected to local issues. She set it up in a way where the way viewers could interact with the work was left very flexible and open, and intended for them to engage with it on their own terms.

My hope is - back to the curiosity piece - that there can be some sense of connection with the environment. And maybe more than anything, it's like an experience of an environment that is very hard to access is made available. And then that environment becomes part of people's personal experience, which can then hopefully lead to a greater sense of connection with that place or those beings or each other, or even just the sense of being part of all of that. (H. Ginsburg, personal communication, April 1, 2024)

All in all, Hope's journey as an artist, educator, and environmental advocate offers a glimpse into the transformative potential of curiosity and collaboration. By embracing her passions and blurring the lines between disciplines, she has cultivated a rich body of work that invites us to explore how art weaves itself into the fabric of our daily lives. By scrambling hierarchies between experts and learners, and fostering empathetic connections with the people in her orbit, her work is an inspiration to approach learning as a collective endeavor, where each voice and perspective contributes to a deeper understanding of the world around us. Ultimately, her work underscores the values of curiosity, empathy, and vulnerability as essential components of meaningful engagement with the world and with one another.

Learn more about Hope's work on her website,
www.hopeginsburg.com.

Eric Fishman



[My hope is] to think about how we can actually help young people be realistic about understanding that there are going to be real impacts [of climate change] that are going to harm people in our lives, and probably people we don't know even more. And within that, how can we imagine people taking steps that are actually reaching towards something hopeful and finding that balance?

Eric Fishman is a teacher in Boston who has taught students in grades three to twelve in different subject areas. Currently, he teaches ninth and tenth-grade humanities at Meridian Academy. Previously, he has taught at schools such as Mission Hill School and the Acera School. As an educator, he is especially invested in exploring how classrooms can be a supportive space for youths to grow their capacities as activists within their communities.

I discovered his climate justice pedagogical work through an article he wrote for *Rethinking Schools* about a curriculum on imagining climate futures with fifth and sixth graders. I reached out to him as I was intrigued by the interdisciplinary approach of his curriculum, which addresses climate change across multiple subjects. I also wanted to learn more about how he has seen his curriculum impact the attitudes of his students toward environmental issues.

In many American elementary schools, students have a homeroom teacher who teaches them all subjects, aside from subjects like art. Eric worked in schools that practiced theme-based teaching, which means connecting the work in different subjects through a central theme, such as climate justice. He first taught a climate justice curriculum in 2016, when he was teaching third and fourth grade in a small private school. Each classroom had one theme for the entire year, and he chose to create a curriculum based on climate justice as the topic lends itself to being approachable from different subject angles such as science, social studies, and history. Throughout the year, he wrestled with questions such as, “How do we teach students about the realities of climate change without leaving them hopeless? What kinds of knowledge do they need in order to be empowered advocates for climate justice?” (Fishman, E., 2018). Over time, Eric’s motivations for teaching climate justice pedagogy evolved as his political analysis and teaching developed. During that period of time, Eric was involved in some climate justice organizing with the Sunrise Movement,* a youth-led movement that advocates for political action on climate change.

* Visit <https://www.sunrisemovement.org/> to learn more.

I think that more and more I saw the ways in which it is like a central crisis for our time period, and for the next generations. It also gives windows into ways to study a lot of both historical violences of colonialism and capitalism and of different systems that are creating the destruction of the climate crisis. And clearly, the young people in our classrooms are going to have to grapple with the consequences of this. So, it’s important that they prepare and have visions for, ‘What are we trying to create collectively? What does it mean to be organizing as a collective? What will be necessary to try to create more just societies in the future?’ (E. Fishman, personal communication, April 1, 2024)

As someone who works with students from a wide age range, Eric shared that he incorporates the same elements into the climate justice curricula he develops regardless of the grade level he is teaching. He adjusts the level of engagement with abstract ideas, making them more concrete as needed to ensure students can engage with the topic effectively. Additionally, he tailors activities and resources to align with the students’ interests and learning styles, whether opting for hands-on, interactive activities or utilizing videos to convey a concept.

At any developmental level, there’s some combination of: you have to understand what the problem is and the root causes of the problem. Going beyond surface level of just mechanics of science to understand at least some tidbit about the idea that this is caused by capitalism. There is also always a component, or I would like there to be a component, of learning about how people organize to make change about this. And then, there is also something about ‘what’s our vision for the future’, which I think is where the kind of storytelling comes in a little bit, although that also comes in understanding the effects of the problem. (E. Fishman, personal communication, April 1, 2024)

He also emphasized that even younger students have the capacity to develop nuanced moral and philosophical stances, but curricula designed for them frequently lack opportunities to grapple with abstract and complex moral ideas, especially around change-making and organizing. Often, young students are presented with narratives of activists in a fairytale-like manner, where their efforts result in immediate positive outcomes without delving into the realistic challenges and complexities of effecting change. Thus, there is much room for improvement in school curricula to acknowledge the capabilities of young students and provide support for their development in this regard.

I was also eager to seek advice from Eric on engaging students with the topic of climate justice in a community setting, similar to my experience with Mini Makerz.** He emphasized that there is not a one-size-fits-all approach to engaging young students with the topic of climate change. He highlighted the importance of understanding his students and leaning into the aspects of climate justice that they resonate with and find meaningful. In community settings where time is limited and student groups are dynamic, Eric recommended starting with a structured and interactive activity, like a game, to spark their interest, before debriefing to understand what they have learned and what connections they have made.

Often it just has to do with what motivates them, how they learn, or what they care about. Certainly, doing things that are more interactive I found engaging for many people because the science is so hard and so abstract. (E. Fishman, personal communication, April 1, 2024)

An example of an activity that Eric has developed for a curriculum is a game called ‘The Quetzal Conundrum’*** which focuses on the Resplendent Quetzal, a bird native to Central America threatened by global warming.

** Refer to next section, “Findings from Teaching Experience”

*** The detailed lesson plan, printable materials, and video demonstrations of the game can be accessed at bit.ly/TheQuetzalConundrumResources

The quetzal plays an important role in the ecosystem as a seed disperser for various species of wild avocado. The avocado trees depend on the quetzal and only a few other species of birds, and likewise, the quetzal depends on the avocados for food. However, due to global warming, the habitats suitable for both the quetzal and the avocado are shrinking. In the game, students take on the roles of wild avocados and quetzals, with the objective of surviving the changing climate. The game was intentionally designed to be impossible to win to illustrate the point that the quetzal is likely to go extinct if current climate trends persist without intervention.

Storytelling plays a crucial role in climate justice education. The role-playing element of 'The Quetzal Conundrum' enables students to immerse themselves in the narrative, fostering empathy for the quetzals and avocados. In our conversation, Eric also mentioned an effective activity from Bill Bigelow and Tim Swinehart's curriculum, 'A People's Curriculum for the Earth,' called 'Stories from the Climate Crisis: A Mixer'.^{****} In this activity, students assume the roles of various individuals from around the world who are affected differently by climate change, including activists, farmers, government officials, and business leaders. By embodying these roles and interacting with others, students gain insights and a deeper understanding of climate change through the diverse experiences of these individuals.

As mentioned in the beginning, I discovered Eric's work through an article he wrote about a speculative fiction curriculum that he developed for his fifth and sixth grade students. In this curriculum, storytelling is used as a tool to help students envision possible climate futures and how the characters in their story grapple with the consequences of the changing climate.

**** These resources can be accessed at <https://rethinkingschools.org/books/a-people-s-curriculum-for-the-earth/> and <https://www.zinnedproject.org/materials/climate-crisis-mixer>

I hoped that writing stories about the future of the places we love could help students begin to envision the realities and possibilities of the coming decades. Perhaps fiction could start to fill in the imaginative gaps between the world we are living in and the world we are moving toward. (Fishman, E., n.d.)

Eric discovered that the students' understanding of climate change went beyond dry fiction and generic descriptions. Instead, their stories offered tangible examples of how climate change will permeate the lives of young people and showcased an awareness of the unequal distribution of these effects. Ultimately, his objective was for his students to grasp and be prepared for the reality of the world they will inherit, while also recognizing the power and potential that organizing for climate holds to shape the future.

To me, "critical hope" in climate pedagogy means imagining a future in which our world has changed, but within which people have taken action – and continue to do so – to transform our communities and protect each other. (Fishman, E., n.d.)

While talking about how Social-Emotional Learning (SEL) can be incorporated into teaching practice, Eric emphasized that SEL should not be treated like a separate subject, but it should be woven into everything that we teach in schools.

Everything involves our emotions and our social lives, because that's literally how we exist and how we learn. I think about what are routines and structures for ways that we engage in processing about who we are, our emotions, and how we relate to each other. And those structures and rituals hopefully support us both in thinking about our social lives outside of what we're learning in school, and also supporting us to think about the ways we're being impacted by things we're learning in school. There's actually real emotional movement happening and changing the way we relate to other people and to the world. (E. Fishman, personal communication, April 1, 2024)



In his teaching about climate justice, Eric tries to incorporate structures such as circle practices, which are part of restorative justice practices, to explore how we are impacted by climate change. He also brought up the importance of providing opportunities for students to process difficult emotions when learning about ecology and climate change, creating a safe space for them to express grief. Eric referred to the work of Joanna Macy, who has developed practices for grief and their connection to ecology.^{*****} Acknowledging the reality we live in a world that will change in unimaginable ways regardless of our actions, Eric recognizes the necessity for students to confront this reality. At present, there is a growing prevalence of climate-related anxiety among youths all over the world (Schechter et al., 2023). Thus, it becomes increasingly important to provide them with support to navigate their fears and uncertainties about the future, while at the same time empowering them with hope and resilience. Some questions Eric is wrestling with while engaging his students with this topic are: In what ways is having space for grief important both for learning about climate change and for action? Could we help them process their emotions through the stories that they're telling about the future?

At the time I had this conversation with Eric, I was in the midst of developing and teaching lessons at a local elementary school around the topic of pollinators (see pages 68-100). As we were discussing this, he raised an important point about the need to strike a balance in teaching a comprehensive perspective of climate change. He noted that mainstream climate curriculum traditionally focuses on distant phenomena, such as the poignant image of polar bears on the melting ice caps. However, he emphasized the significance of understanding how climate change impacts our immediate communities, while also recognizing that other regions may be more severely affected. The topic of pollinators offers a window into this concept, as they play a role in local ecosystems while also providing opportunities to explore broader ideas such as migration and invasive species and their effects.

***** Refer to chapter 7: honoring our pain for the world of *Coming Back to Life* (1998) by Joanna Macy and Molly Brown or visit <https://workthatreconnects.org/resources/cairn-of-mourning/> to learn more.

In terms of student impact, I was curious to find out how Eric has observed his students evolving or shifting their perspectives on their relationship with the natural world over the course of his long-term work with them.

It is sometimes true that when I teach about climate justice, I have this grand vision of how we're all going to be deeply transformed by this. And often, that's true for some students. And for others, they're like, 'cool, I don't really care about this', but maybe there's some sort of seed that's planted for later on. I certainly have had a handful of students who are interested in doing more climate justice work and have connected folks with local organizations and things like that. I think usually, the highest impact I've seen are when students come in already very invested in some aspect of this. I think there can be two temptations with engaging students with climate justice work. The first is thinking that to get students invested in this, we have to talk about how horrible the problem is because we need them to see how serious it is and why they need to care about it. And I think that's true. But, I've also seen the ways in which this can lead to significant anxiety for kids and that is real too. Secondly, I think there is also the opposite end of the spectrum that is like, 'We're gonna teach you about this, but it's totally fine. We're all going to organize and it's going to change,' and offer a hokey kind of hope.

One thing I've often thought about and wrestled with and don't have answers to is: 'How do you engage students by being real about what the possible consequences are, being real about what the kind of organizing actually looks like to make that happen, and being real about the possibilities that are available?' Because I think sometimes there is either extreme climate dystopias, or there is, in my opinion, meaningless storytelling that's like, 'Oh, we solved it, everything's great, and it's going to be totally fine.' But what does it mean to

have a middle line? That was my hope - to think about how we can actually help young people be realistic about understanding that there are going to be real impacts that are going to harm people in our lives, and probably people we don't know even more. And within that, how can we imagine people taking steps that are actually reaching towards something hopeful and finding that balance? I found this tricky to strike, but it feels important. (E. Fishman, personal communication, April 1, 2024)

Eric Fishman's holistic approach to climate justice education embodies the importance of empowering students to confront the complexities of our rapidly changing world with curiosity, empathy, and hope. Through dynamic pedagogical practices that integrate interdisciplinary learning, social-emotional support, and immersive experiences, Eric creates a transformative educational environment where students not only learn about these important issues but are also empowered to advocate for meaningful change within their communities.

Learn more about Eric's work on his website, www.ericjfishman.com.



Kay Vasey



Transporting people away to places they can't otherwise go in real life is an incredibly powerful way to get people to act.

Kay Vasey is the Founder and Chief Connecting Officer of MeshMinds, a non-profit foundation in Singapore that orchestrates the fusion of art and technology to address pressing social and environmental issues through creative technology education. They do this by bringing artists, developers, and sustainability advocates to build immersive games to educate and empower youths in Asia Pacific.

Kay was previously a technology lawyer and she had also been the Head of Arts at the British Council. She has always been passionate about the arts and committed to effecting positive change. Born in Brunei and deeply influenced by her formative years surrounded by lush jungles, Kay's upbringing instilled in her a profound reverence for nature and a desire to safeguard it for future generations.

When I had kids, I really wanted to make sure that this world is preserved for them so that when they go snorkeling, they actually see some marine life and not just a bunch of dead, white coral. (K. Vasey, personal communication, November 21, 2023)

As she started to think about being an entrepreneur, she brought together her skills and her interests - art and technology. However, she did not want to stop there. Kay saw the significance of pursuing these things for social and environmental good. So, she created MeshMinds which endeavors to bridge the gap between environmental advocacy and youth engagement through innovative creative experiences.

When you look at the effect of David Attenborough's Blue Planet and Greta Thunberg's work, sustainability has become more and more firmly on the agenda. Yet, brands still struggle with how they tell their sustainability stories. It got me thinking, "Is there a way that we can think about immersive and interactive storytelling for brands that want to do more in relation to the planet and then help them to communicate their messages to youth audiences?" (K. Vasey, personal communication, November 21, 2023)

MeshMinds has employed various cutting-edge technologies such as Virtual Reality (VR) and Augmented Reality (AR) to educate and empower youths to bring their art to life (figure 3.7). One of the programs that they teach students to use is **Artivive**, which can make any static 2D image or 3D model come to life in an immersive animation. Artivive is a simple “drag and drop” tool that has been taught to students ranging from young children to seniors. MeshMinds has also worked with artists around the world to create AR art (AR.T) using Artivive to celebrate World Oceans Day,* highlighting the beauty and importance of our oceans.

Another program that they have used is **Meta Spark**, which is the tool used to create AR face filters and effects on Instagram and Facebook. MeshMinds created an AR for good curriculum using Meta Spark which has been taught to thousands of young creators across Southeast Asia. Additionally, MeshMinds has also collaborated with Make The Change to create a section in an Apple-based curriculum, teaching students how to use AR features on iPads.

In recent years, MeshMinds has also been exploring gaming platforms such as Roblox as part of a holistic learning journey, facilitating immersive learning experiences that transcend traditional teaching methods. One of the games that MeshMinds has developed on Roblox is **Sky Farm Island**,** a sustainable farming game where players use hydroponics and aquaponics to grow crops without soil, convert food waste into fertilizer, and collaborate with other community farmers to explore the future of food production (figure 3.8).



Figure 3.6
A Better Tomorrow (2019), André Wee, AR artworks
<https://geekculture.co/take-a-stand-for-environmental-conservation-with-meshminds-2-0-artxtechforgood-exhibition/>

In terms of thinking about measuring the impact of these programs on the participants, Kay pointed out an example of a project called **Water Bodies**. For this project, MeshMinds collaborated with an artist, Adeline Tan (Artist moniker, Mightyyellow), and two university professors in Singapore to explore the use of VR immersive and interactive storytelling to drive positive environmental impact. The project is realized as a VR game where the

farms being put up the side of apartment buildings in Singapore?, through virtual roleplay and gaming, in a platform where 70 million children around the world are logging in daily and really love to explore these 3D worlds, I say why not? Why not have that as an add-on to the curriculum and allow children to spend a little bit of time in the virtual world to see how content in a textbook could come to life? For example, they can explore and experience the virtual world together with their friends and create opportunities for social learning. I can come and water your plants, you can come and fertilize mine. That is more engaging and impactful, in contrast to sitting in a classroom and learning about what aquaponics is in a textbook looking at a 2D diagram. (K. Vasey, personal communication, November 21, 2023)



Figure 3.8
Planting crops in Sky Farm Island, Roblox
<https://www.roblox.com/games/13421937408/Sky-Farm-Island>



Figure 3.9
Water Bodies VR gameplay, The Meshminds Foundation
<https://sagg.info/meshminds-2-0-artxtechforgood/>



Figure 3.10
Water Bodies VR in-game experience, Adeline Tan (Vasey et al., 2019)

player travels through the digestive tract of a human, in which they would find pieces of microplastic fragments floating around the human stomach (figure 3.9, 3.10). Then, they are suddenly confronted with a first-person shooter game where they have to shoot the microplastics as fast as they can in 60 seconds. As the player shoots at each microplastic, the sources of the microplastics, such as t-shirt fiber, plastic straw, or plastic bottle, are revealed. At the end of the game, the player gets a score and a list of the objects that they found. The concluding segment of the game then shows information about ways we can reduce microplastic pollution. Prior research indicated that embodiment in VR can immerse people in experiences with the potential to be powerful, engaging, and empathetic qualities. These qualities can help people to become more attuned to global issues and raise awareness about environmental concerns (Vasey et al., 2019). The research conducted for this project showed that for 20 participants, their awareness of the presence of microplastics within our bodies almost doubled when comparing their pre-VR experience and post-VR experience answers. This suggests an overwhelmingly positive effect of VR storytelling and gameplay on raising the awareness of microplastic existence in the human body. More than half of the participants also expressed their intention to make positive changes to their habits, such as using recyclable cups, using reusable shopping bags, and refusing plastic straws.

This indicates that, hopefully, if people feel that they know more after the 60-second experience, that they would maybe think twice when they reach for that single-use plastic bottle. (K. Vasey, personal communication, November 21, 2023)

Another project that Kay pointed out was **Oceans We Make**, an immersive and interactive VR experience created in collaboration with Warrior9 VR using Unreal Engine. In this VR experience, participants find themselves in a beautiful ocean landscape. While they are enjoying the environment and marveling at the marine creatures around them, they are prompted to reach out and grab a piece of trash that begins to appear along their path and they are then given 3 minutes to collect as much trash as possible (figure 3.11). Over time, more and more trash appears in their environment to the point

* Visit <https://www.meshminds.com/art-for-the-ocean> for more information.

** Visit <https://www.skyfarmisland.com/> to access the game.

where it is impossible for the player to keep up. The game concludes with the participant being brought up to the ocean surface to see the first-person perspective of the Great Pacific Garbage Patch, prompting them to realize the scale of pollution that overshadows the beautiful ocean that they experienced at the beginning of their journey.

Transporting people away to places they can't otherwise go in real life is an incredibly powerful way to get people to act. Certainly for me, bringing together beautiful 2D, 3D artwork with these frontier technologies, and then trying to get people to answer a call to action in some way or catalyze positive behavior towards that movement, whether it's plastic pollution, or something else, is incredibly powerful. (K. Vasey, personal communication, November 21, 2023)

Oceans We Make was exhibited in various locations, such as Singapore, Thailand, Japan, and the United States, resulting in over 1000 people experiencing the impact of the work. In a study with 200 participants, 69 of them filled out a post-experience questionnaire (Thomas et al., 2018). On a scale of 1 to 10, participants rated their concern for ocean pollution after the VR experience at 8.68. A participant said that they felt sad seeing the fish being poisoned and killed by the pollution, "while we are saving ourselves, we forgot all about the innocent animal." Another participant said that the experience makes the issue of pollution more relatable as it visualizes the ways that it affects sea creatures, highlighting the urgency of the issue. These results show that the participants displayed an increase in empathy towards other species which prompted them to change their behaviors and use less plastic. Although it is proven that these interactive experiences have a positive impact on participants, measuring their long-term impact is still a challenge due to limited resources for additional studies.

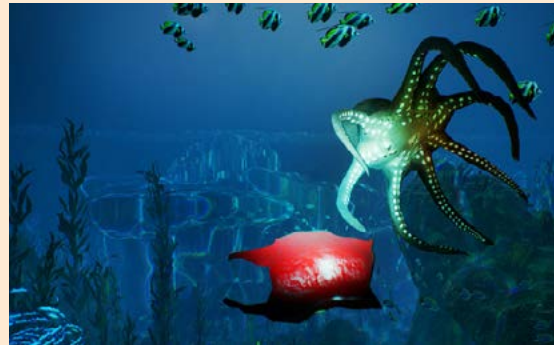


Figure 3.11
Red plastic bag floating in the ocean, Oceans We Make in-game experience
https://store.steampowered.com/app/1102200/Oceans_We_Make/

Beyond environmental awareness, Kay underscores the significance of fostering environmental stewardship. Rather than just advocating for universal environmental challenges, it is also important to educate people about their local environment and challenges within their own communities. MeshMinds promotes the integration of local cultural knowledge into environmental education, emphasizing the intrinsic connection between cultural identity and environmental consciousness.

How can we make sure that we teach people about culture, in order to then preserve the environment? If you know where you come from, what language you speak, and why the buildings are designed the way that they are in your city or town - those kinds of cultural pieces are very important because they instill a sense of belonging. And once you feel that you belong to something, then that means that you are more naturally going to care for your environment. (K. Vasey, personal communication, November 21, 2023)

In Kay's vision, artists play a central role in catalyzing positive change through their ability to communicate complex issues visually. She champions the transformative potential of art and immersive creative experiences to inspire empathy, drive action, and cultivate a deeper understanding of our interconnectedness with the natural world.

I really hope that creators, any type of creator, can see how they can create really meaningful, impactful, purposeful work using digital tools that really can change the way that people behave in this world and for the benefit of people and planet. Creative people are the most important people in this whole puzzle for me because we don't all speak the same language, but a picture tells a thousand words. So I think that those who can communicate visually have a really important part to play when it comes to climate and cultural literacy. (K. Vasey, personal communication, November 21, 2023)

Art has the unique power to transcend the spoken and written word and evoke deep emotional connections. Through the process of creating art, not only do artists get the opportunity to learn more about their environment and culture, but they also actively engage and collaborate with their local communities. Immersive creative experiences have the capacity to cultivate empathy, a cornerstone reflected in MeshMinds' core values of leadership, creativity, sustainability, collaboration, and empathy. Through MeshMinds' initiatives, art emerges as more than just a medium for expression; it also serves as a catalyst for driving social and environmental transformation, fostering a collective consciousness that nurtures a sustainable future for current and future generations.

Learn more about MeshMinds and the work of Kay and her team at www.meshminds.com.



Findings from Teaching Experience

Throughout my time in the TLAD program, my involvement with Mini Makerz Art Studio through a graduate assistantship has been a cornerstone of my experiential learning. Mini Makerz is a community-based program that offers free weekend and after-school visual arts classes to young children and their families in the greater Providence, RI area. As part of the TLAD program curriculum, I designed several lesson plans centered around the topic of art, ecology, and sustainability for the elementary curriculum class during the fall semester. With feedback on my initial drafts and a growing understanding of lesson plan construction, I adapted and revised my lesson plans to fit the setting of Mini Makerz. In the fall semester, I was able to implement one of my lesson plans within the dynamic setting of a weekend Mini Makerz session, which provided me with invaluable hands-on experience that allowed me to integrate my academic pursuits with real-world practice. This experience not only developed my pedagogical skills but also contributed to my ongoing research.

In the Spring semester, my engagement with my research topic expanded through an internship with Creature Conserve, a non-profit organization founded by Dr. Lucy Spelman dedicated to grow art-science pathways for wildlife conservation. Throughout the internship, I worked closely with Dr. Lucy Spelman to develop educational programming for youths aimed at integrating art and science to foster empathy for other species, which I implemented within the context of Mini Makerz. Additionally, I had the privilege of teaming up with my TLAD peer, Kaitlyn Lawrence, to conduct an after-

school visual art program with Mini Makerz at a local elementary school. Together, we crafted a three-week curriculum blending elements of our respective research interests. Kaitlyn's research focuses on social-emotional learning and trauma-informed pedagogy, which aligns well with my emphasis on empathy building.

Over the course of the Fall and Spring semesters, I have had the privilege of leading and co-leading five Mini Makerz sessions. While my overarching goal with this research was to evaluate pathways for art curricula to cultivate emotionally and socially engaged ecoliteracy (Goleman et al., 2012), the scope of my research posed limitations to this exploration. Therefore, I established two primary objectives for these sessions: firstly, to observe how students engage with art-making as a means of processing and responding to information presented to them during presentations, storytelling, and discussions. Secondly, I aimed to assess how integrating scientific information or engaging in discussions about the impacts of human activity on pollinators could foster empathy for and understanding of pollinators—and the concept that we are all animals that are part of an interconnected ecosystem—among elementary-level students in the art classroom. Despite the constraints of time and limited opportunities for long-term engagement with students, each session has significantly contributed to my understanding of how young students utilize art as a medium for expression and comprehension. These experiences reaffirmed the transformative impact of community-based art education and provided a glimpse into how I can continue to develop and explore avenues for integrating environmental education into an art curriculum beyond this research that has the potential to nurture a generation of environmentally conscious citizens.



Mini Makerz Weekend Program

During the academic year 2023-2024, Mini Makerz organized four to five free weekend programs at Mount Pleasant Library, a community library in Providence, on Saturday mornings. The weekend programs are open to children ages of 4 to 9 who are enrolled in pre-schools, public schools, and charter schools in Providence, Pawtucket, Woonsocket, or Central Falls, Rhode Island. Registration is required and is capped at 15 students on a first come first serve basis.

We took turns among the four graduate assistant Mini Makerz instructors leading the lessons. I got to lead one session of the weekend program each semester. The class size ranges from week to week and attendance is unpredictable as some students may not show up even though they have registered, and there were also times when families who happened to be at the library would join the program.

The following sections include images of student work and my personal reflections from each session of the program. The lesson plans and teaching materials including presentations and worksheets can be found in Appendix B, or you may visit bit.ly/JS2024MiniMakerzResources to access them online.

Session 1: Turning Trash into Treasure

This was the first lesson I planned and executed for Mini Makerz in the fall semester, and it represented a pivotal moment for me and the direction of my thesis. At this juncture, I was still in the process of refining my research topic and had not yet pinpointed a specific focus for my thesis. Consequently, I did not take detailed notes on specific examples of student interactions or behaviors during this class, as I was still unsure of how I was going to incorporate my reflections in my thesis. Nonetheless, this session served as a crucial starting point, offering valuable insights into working with the age group I am teaching as well as seeing how to effectively integrate science and ecology into the art activity.

The session entails a read-aloud of the picture book *This House Once* (2017) by Deborah Freedman, an introduction to Patrick Tagoe-Turkson's work and creative process, and an art activity where students design and create planters or bird feeders from reclaimed plastic bottles. The idea for this class stemmed from a desire to engage students in discussions about plastic pollution from a different angle—one that still recognizes the reality of the situation but does not dwell on the typical negative, dystopian narrative (Talgorn & Ullerup, 2023). Instead, I wanted to encourage students to see the situation in a more positive light and explore possible creative solutions such as repurposing plastic bottles to benefit the environment instead of discarding them. One of my goals for this project was to inspire students to rethink how they view waste materials and consider creative, innovative ways to repurpose them (Eckhoff & Spearman, 2009). Additionally, I aimed to introduce local biodiversity to the students and encourage them to think about ways to support other animals in our shared environment through this project.

To prepare for the session, I did some research on the ethics of bird feeding, tips for bird feeding in the winter, the types of birds present in Rhode Island in the winter, as well as their diets. I also created some handouts for before and after the project, including a worksheet for sketching their designs of the planters and/or bird feeders and take-home instructions. I also created samples of a plastic bottle pot and different types of bird feeders to provide references for the students (figure 3.12). This not only helped me gauge the time needed for the project but also clarified areas where students might require adult supervision or assistance. For example, I realized that

younger students might struggle to cut plastic bottles and that it would be helpful to have adults standby to supervise or assist them with box cutters or X-Acto knives to make the first cuts before students could use scissors to shape their creation independently. I also found that applying acrylic paint directly to the bottle without a base coat resulted in less vibrant colors, while a layer of gesso helped the paint to be more opaque. Additionally, I noted that they might also need help with creating drainage holes on their planters or inserting wooden dowels into their bird feeders.

Before the start of the session, we prepared and organized the materials on one table to leave room on the main workspace (figure 3.14). However, in hindsight, as we did not have much space for movement at the lesson site, the materials could have been more spread out to allow people to access them at the same time and avoid crowding. We also placed coloring pages on the large tables where students would sit so that they could start working on them as we waited for more students to arrive (figure 3.13). I printed out some winter-themed bird coloring pages to match the theme of the project.

Once most of the students had arrived and settled in, we moved over to the carpet for the read-aloud. I began by explaining my thesis and asked for the students' assent to take photos during the session, before diving into the story and project. When we started reading the book, the

students were more interested in the illustrations than the narrative, often getting distracted by getting up close and pointing out specific parts they liked or were curious about (figure 3.16b). This made it a bit difficult to gauge their understanding of the story, which could have been followed up with a short discussion asking questions such as, "What did you learn from the story?", "What did you notice about the materials that make up the house?", and "What are some other examples of how a material can be transformed into something else?"

I introduced the artist, Patrick Tagoe Turkson, a Ghanaian mixed-media artist who upcycles plastic waste, such as old flip flops, to create abstract sculptures (figure 3.15). I showed the students a video of his process and explained how he collects flip flops from the ocean to use as materials for his art. I also made sure to briefly talk about how plastic in itself can be good and useful for many different things, but single-use plastic can be harmful for the environment as they are usually thrown away after being used only once and take a very long time to break down. To transition to our activity, I asked the students if they had ideas for how we can reuse plastic bottles and received some creative suggestions.



Figure 3.12
Example of plant pot and bird feeder made from plastic water bottles.



Figure 3.13
Students working on coloring sheets as a pre-class activity



Figure 3.14
Materials table



Figure 3.15
Ofre (2018), Patrick Tagoe-Turkson, OOA Gallery
<https://ooagallery.com/artists/58-patrick-tagoe-turkson/works/9802-patrick-tagoe-turkson-ofre-2018/>



Figure 3.16a, 3.16b Reading *This House Once* by Deborah Freedman



Figure 3.17a, 3.17b Students sketching their plant pot/birdfeeder and selecting their materials



Figure 3.18 Explaining process to students



Figure 3.19 Student work-in-progress

It was a little challenging to try to share all the information I wanted to in a limited amount of time, and I was not sure if the students were able to make the connections between the story, activity, and the ecological/environmental aspect of the project. In hindsight, I could have broken down the information into more manageable chunks to better engage the students and draw clear connections between the story, activity, and the broader ecological themes. Additionally, I could also have given clearer instructions about the process for creating the planters or bird feeders. Instead, I let the students dive into the project without a proper explanation, leading to some confusion. This could have been mitigated with better planning and time management. One aspect I had not anticipated was that some students chose to copy the examples I made rather than creating their own unique designs. To encourage creativity in future sessions, my professor, Dr. Shana Cinquemani, suggested making a few incomplete examples to inspire different approaches and to leave room for interpretation of the project.

Despite those minor challenges, the session went smoothly and the students were really excited and motivated to work on their projects. They were proactive in asking for assistance when they needed it and were very engaged and focused throughout the class. Given the community-focused nature of this program, collaboration between students and their parents or guardians became an integral part of the experience (figure 3.20). Although the class was designed for children, I hoped that families would participate and learn together with their children. Intergenerational learning moments are precious and valuable, and my hope is that the adults collaborating with the children could also take away some knowledge or ideas for future projects they could do together using plastic bottles or other reclaimed materials.

To wrap up the session, I assisted the students who had finished their planters by using awls to create drainage holes. I then filled their pots with soil and gave them a heart-shaped piece of seeded paper. I provided each student with an instruction card and explained how to plant the seeds to both the student and the parent/guardian. For those who made bird feeders, I filled an empty bottle with birdseed so they could take it home easily. (In the future, I would likely prepare these beforehand in smaller bottles or paper bags to save time and ensure a smoother process.) I also handed out cards with tips for feeding birds in Rhode Island during the winter.



Figure 3.20 Family members working with their children

Overall, the students created beautiful and unique work, demonstrating a high level of engagement in the activity. I noticed that some students found it helpful to sketch their ideas before starting on their project, which helped them stay focused and complete their work within the session. As mentioned earlier, many of the students had the support of an adult, which likely contributed to keeping them on track and meeting the time constraints. If this lesson was conducted in a classroom setting rather than a community-based environment like this weekend program, students might need additional time and assistance with their projects, or it might be better suited for slightly older students

Many students creatively designed their planter or bird feeder based on animals they liked. For example, a student collaborated with her parent to create a planter in the form of a pink horse that closely resembled her initial sketch. Another student created a bird feeder that resembles a bird. Even the students who followed my cat planter example added unique touches to make it their own.

Unfortunately, because the Mini Makerz workshops had inconsistent student attendance, I was unable to follow up with participants to find out if they planted their seeds or successfully hung and used their bird feeders. Nonetheless, I believe that the lesson and activity had some positive impact in bridging the gap between art, ecology, and everyday life.



Figure 3.21
Student's completed bird-feeder



Figure 3.22 Students' work-in-progress and completed plant pots and bird feeders

Session 2: Message from the Ocean

This lesson took place in the middle of Spring semester, and it was the last Mini Makerz session that I led. Similar to the previous session, 'Turning Trash into Treasure,' this lesson is focused on learning about plastic pollution while encouraging empathy for other animals through storytelling (Talgorn & Ullerup, 2023; Budnik & Ernst, 2022; Hawkman et al., 2022) and a role-taking activity (Lithoxoidou et al., 2017). As Talgorn and Ullerup (2023) said, "building stories with [non-human] personas will help imagine their stance, emotions, intents, and reactions along a journey, which is key in recognizing their agency and moral kinship and putting the non-human to equal footing with the human" (p. 2). The session begins with a read-aloud of *The Tale of the Whale* (2021) by Karen Swann, a story about a child and a whale and their journey through the ocean. This is followed by an introduction to Singaporean artist, Tan Zi Xi, works from her illustration series, *An Effort Most Futile* (2009), and her installation, *Plastic Ocean* (2016). I would then engage the students in a short discussion before introducing the project where students create their own "message in a bottle" from the perspective of a marine creature. This session had a full registration, but only three attendees showed up, likely because it was the weekend before spring break. However, midway through the session, two more students joined the activity. Despite the low turnout, we still had a productive session and I was able to engage in a more detailed discussion with the students.

We set up the materials on a separate table and placed ocean-themed coloring pages on the main workspace (figure 3.23). This allowed the students to engage with the topic of the lesson while waiting for other students to arrive. During this time, some conversations about various sea creatures came up. For example, one student talked to me about his love for bull sharks as he was working on his shark coloring page. Another teaching artist and student were discussing and drawing "The Bloop", a giant mythical sea creature that "eats other sea creatures and humans."

Afterwards, we transitioned to a time of storytelling and discussion at the carpet. I started reading *The Tale of the Whale*, which begins with a lighthearted story of a child that is invited on a journey to the ocean by a whale. Together, they swim through beautiful oceanscapes and encounter

various marine creatures along the way. However, as their journey progresses, they confront the distressing reality of encountering an abundance of trash in their path. The story ends on a hopeful note, with the child gathering their friends to do a beach clean-up to "change the story of the whale." Throughout the reading, I would intermittently pause and draw attention to some details on the page, while students eagerly contributed by pointing out observations or raising questions. Here is a part of our discussion:*

The whale's tummy rumbled, his mouth opened wide, and half of an ocean was swallowed inside...

"What do you see in there?"

"The ocean is dirty because there's a lot of trash."

"Is the trash supposed to be there?"

"No"

"How do you think the trash got into the ocean?"

"Because there's no trash can on the beach"

I stared at the whale as he stared back at me—I understood now what he'd brought me to see (figure 3.25)

"It looks like the whale is crying"

"Maybe he is upset"

"What did the whale want to tell or show to the character?"

"[The sea animals] are not having fun anymore because there is trash in there"

"What can we do to prevent this from happening?"

"Stop putting trash in the ocean"

"Sometimes trash ends up there by accident. I don't think there are a lot of people who would say that they throw trash in the ocean on purpose, but sometimes wind can carry trash from the landfill or trash that is not thrown away properly to the ocean."

* The *italicized* text refers to the text from the book, the **bold** text refers to me speaking, and the regular text refers to the students' responses.



Figure 3.23
Materials for project



Figure 3.24
Reading *The Tale of the Whale* by Karen Swann, students pointing to the tears in the whale's eye



Figure 3.25
Spread from *The Tale of the Whale*

As we were discussing the page that showed different examples of how various sea creatures could be affected by plastic pollution, some students suggested that the animals were trying to rescue one another.

Following the read-aloud, I introduced the artist Tan Zi Xi. I first showed her illustrations from the series *An Effort Most Futile* (2009), which depicts the overwhelming amount of trash in the ocean. I asked the students to share their observations, and one of them pointed out that “there is trash in the ocean” and another said that they see “rocks and garbage.” After that, I showed them an image of Tan Zi Xi’s installation, *Plastic Ocean* (2016), composed of 20,000 pieces of waste suspended in a space to evoke the sense of being in an ocean full of trash (figure 3.28). A student commented, “This looks funny because there’s a new shirt [which has a] tag on it. This is funny because somebody throw [sic] their new shirt in the ocean.” This observation highlighted the absurdity of a piece of clothing that appeared to be brand new and useable ending up as waste in the ocean. Unfortunately, this scenario reflects the reality of textile waste which is a significant contributor to ocean pollution. As I showed the students a video of a walkthrough of the installation, I invited the students to imagine what it would be like to be in the position of a fish in that setting.

“How would you feel if you were a fish swimming through an ocean like this?”

“It’s uncomfortable.”

“I would die if I ate all of that [trash]. I would never go into the ocean again. I would go near a shark and make them kill me.”

The last student suggested moving to the desert and explained that he would bring “a gallon of water and lots of food” to help him survive. After concluding the discussion, I proceeded to introduce the project. I first explained the concept of a “message in a bottle” and presented the prompt: “If you were a sea creature what would you want to say?” Subsequently, I shared my own example and provided an overview of the activity.



Figure 3.26
Spread from *The Tale of the Whale*



Figure 3.27
Showing students Tan Zi Xi’s illustrations, *An Effort Most Futile*



Figure 3.28
Plastic Ocean (2016), Tan Zi Xi
<https://oceanic.global/tan-zi-xi/>

As the students began selecting their materials and delving into their projects, we welcomed two more participants who joined the session. Because they missed the storytelling and introduction to the artist and project, I provided a brief overview of the activity, and they eagerly jumped in to participate. We started by picking a bottle and trimming the height of the paper to fit inside the bottle. After that, the students focused on crafting messages or drawings from the perspective of various marine animals. Like last week, some parents or guardians actively engaged in collaboration with their children, with one parent even creating their own project alongside their child.

I observed that many of the students required assistance with spelling. In such cases, the adults assisting them provided sample messages for the students to replicate on their papers. The two students who joined midway through the class were siblings, and the older sibling generously helped the younger one throughout the session. This issue could be something to consider when conducting this lesson with a group of younger students as they might benefit from additional support. In a classroom setting with limited time and adult supervision, this lesson might be better suited for a slightly older group with more advanced reading and writing skills.



Figure 3.30
Student working with parent

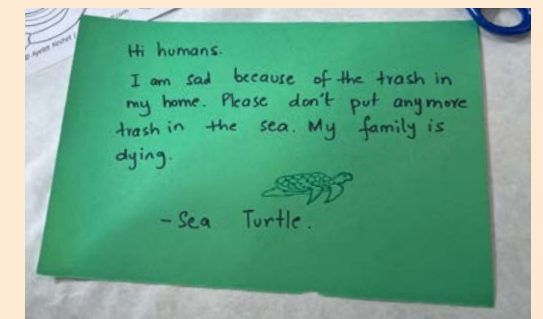


Figure 3.31
Parent’s message from the perspective of a sea turtle



Figure 3.29
Student’s message from the perspective of a bullshark

The student who had a keen interest in bull sharks collaborated with their parent to craft a heartfelt message from the perspective of a bull shark: “Hey humans, please save us sharks. Don’t put trash in the ocean” (figure 3.29). Simultaneously, the parent worked alongside their child, contributing a message from the viewpoint of a sea turtle: “Hi humans, I am sad because of the trash in my home. Please don’t put anymore trash in the sea. My family is dying” (figure 3.31).

Another student independently crafted a message from the perspective of a seal, echoing a similar sentiment: “Never put trash in the ocean, please” (figure 3.32). The student who was discussing about “The Bloop” with another teaching artist took a unique approach to their message, writing it from the perspective of the mythical sea creature. Rather than portraying “The Bloop” as scary or menacing,

their interpretation depicted it as a harmless creature that rescues marine animals from plastic pollution. The message reads: "I need to find the sealion," accompanied by a drawing of a seal, as well as a drawing of "The Bloop" on the paper that lined the table surface (figure 3.33).

The older sibling in the pair crafted a detailed and thoughtful message from the perspective of a hammerhead shark, which reads: "Hello humans, can you please stop throwing trash in the ocean? Use biodegradable plastic or limit the amount of plastic that goes in the ocean. As a hammerhead shark it's hard to catch prey when there's so much trash". On the other hand, the younger sibling

drew a starfish and a sea turtle on her paper and wrote a simple but powerful message: "Hi we are animal. Animal are dying [sic]" (figure 3.33).

Once students finished writing or drawing their messages, they proceeded to fill their bottles with colored sand and decorate them with various craft materials such as stickers, pompoms, pipe cleaners, ribbon, and more. The last step involved rolling up the paper and securing it with string before placing it inside the bottle. Because rolling the paper small enough to fit through the bottle opening was somewhat tricky, this particular step proved challenging for younger students and many of them needed

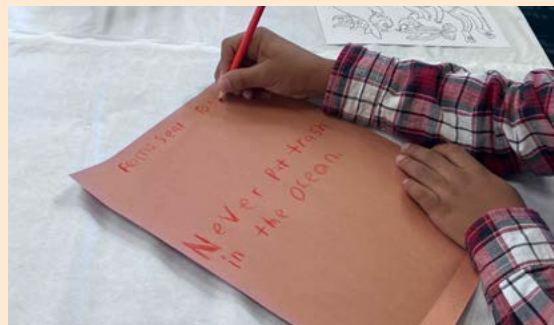


Figure 3.32 Student's message from the perspective of a seal



Figure 3.33 Student's message from the perspective of "The Bloop", with a drawing of "The Bloop" next to the letter



Figure 3.34 Students' work; Left, younger sibling; Right, older sibling.

assistance. One of the supporting teaching artists devised a simple solution by rolling the paper together with a marker, essentially using it as a guide to achieve the desired tightness of the roll. After the paper was rolled around the marker, the marker could be easily pushed out, leaving the rolled paper intact and ready to be placed inside the bottle. This could be a potential method to advise or assist young students to complete this step independently. Finally, as a concluding activity, students were provided with paper tags on which they could stamp the sea creature that their message represented. These tags were then tied around their bottles as a final touch (Figure 3.35).

Overall, this lesson proved to be both productive and successful. Throughout the session, the students were deeply engaged with the project. I had the opportunity to glean insights into what the students had previously learned or understood about the topic, which was fascinating to hear as they shared their thoughts, comments, and questions. Many students at this age seem to be interested in learning about animals, making the use of animals as a focal point for the activity and discussions particularly effective in capturing their attention and helping them understand and empathize with the issue at hand. The students demonstrated a high level of cognitive and affective empathy in the form of empathic concern for sea creatures during discussions, exhibiting skills such as feelings identification and perspective-taking (Budnik & Ernst, 2022). Like the previous weekend session that I led, the collaboration between the students and their parent, guardian, and/or sibling was also very heartwarming to see as it demonstrates the potential positive impact of these activities in nurturing empathy for the planet not just among students but also their families.



Figure 3.35 Students' completed artwork

Mini Makerz + Creature Conserve

Over the course of three weeks, Kaitlyn and I conducted additional Mini Makerz sessions in the form of an after-school program at Norwood Elementary School in Warwick, RI. The program was conducted from March 28th, 2024 to April 11th, 2024, and each session is 1 hour and 30 minutes long. We worked with the same group of fifteen students ranging from 3rd to 5th grade, with two absences on the first week and one absence on the third week.

We developed a curriculum around the theme of pollinators with various art-making activities for each session. The first session focuses on conveying scientific information about pollinators, covering topics such as: what pollinators are, why they are important in the ecosystem, what they need to survive, and threats to their population. This was followed by a collage activity allowing students to respond creatively to the material. In the second session, we revisited the content covered in the previous week and organized a storytelling activity where students crafted their own story and created a zine. The final session focuses on fostering empathy and perspective-taking through creating a three-dimensional model of a garden students would design for pollinators.

Aligned with the mission of Creature Conserve, our overarching objective was to convey the message that we are all animals and we are in an interconnected ecosystem – if other animals are in trouble, we are in trouble too. By introducing students to art-making as a method of learning about other species and conservation, we aimed to instill a sense of curiosity and empathy that would

hopefully inspire further exploration and meaningful action. The theme of pollinators served as a tangible example of local biodiversity while also facilitating discussions about broader environmental issues.

We sent out this introductory blurb to Emma Lemire, the after-school program coordinator, to include in the sign-up form:

During the month of April, students in grades 3-5 are welcome to join us as we journey into the world of nature and art! During these three, fun-filled weeks, we will immerse ourselves in the colorful world of pollinators. We will learn about local pollinators in Rhode Island and threats to their population, share empathy for them, exchange ideas, and find opportunities for growth at the intersection of art, science, and conservation. This program is supported by: the Rhode Island School of Design, Department of Teaching + Learning in Art + Design.

As mentioned in the introduction, Kaitlyn and I entered this program with overlapping yet distinct objectives. While my focus is centered around observing the connections that students are making in the class and encouraging the development of empathy for the natural world, Kaitlyn's focus lies on interactions with students and assessing the overall class environment within the framework of social-emotional learning and trauma-informed pedagogy.*

The following sections include images of student work and my personal reflections from each session of the program. The lesson plans and teaching materials including presentations and worksheets can be found in Appendix B, or you may visit bit.ly/JS2024MiniMakerzResources to access them online.

* Lawrence, K. (2024). *Growing Together: Cultivating the Social-Emotional Effects of Art Education through Trauma-Informed Pedagogy* [Master's thesis, Rhode Island School of Design]. Rhode Island School of Design.

Week 1: The Amazing World of Pollinators

For the first session of the program, I prepared a short presentation as I wanted to make sure that we spent some time establishing a foundational understanding of pollinators. This was done to ensure that the students' creative time would be informed by and grounded on knowledge about the subjects that would inspire their work and to prevent the cultivation of 'false empathy' (Talgorn & Ullerup, 2023). Understanding that this was an after-school program and students might be tired or restless after a whole day of classes, I tried my best to convey the main message as quickly and succinctly as possible so as to keep them engaged and enthusiastic for the art activity. I also anticipated that some students might possess prior knowledge about pollinators or the process of pollination either from science classes or personal interests before this program. My primary goal is to emphasize the vital role of pollinators in the ecosystem and help students to recognize our similarities and connections to these species.

As we did not have access to the projector in the art studio, the after-school program coordinator kindly helped us to set up our slides in the library which was across the art studio. We began the class with a brief introduction to get to know one another and students shared their favorite desserts as an icebreaker question. Many of the students expressed their fondness for chocolate-based treats like chocolate ice cream and brownies. This served as a good segue into the presentation, particularly when we later discussed the various foods we eat, including chocolate, that rely on animal pollinators to reproduce. As we began the presentation, we distributed the worksheets and explained to the students that they can write or draw things they find interesting from the presentation and to use the worksheets to generate ideas that will be useful for the art project. We emphasized that there is no right or wrong answer and that they do not have to answer every question.



Figure 3.36
Students' work-in-progress

Overall, the presentation portion of the class was very successful, with students displaying high engagement and responsiveness during discussions.*

“What is an animal?”

“maybe a dog?”

“a living creature.”

“something in your imagination.”

I went on to explain briefly that there are many different kinds of animals living in various parts of the world, emphasizing that we humans are animals too.

“Does anyone know what a pollinator is?”

This question garnered several raised hands.

One student defined a pollinator as “somebody that pollinates plants.”

A student said, “there are two insects that are pollinators which are butterflies and bees,” and another chimed in to say, “they can make honey.”

I then elaborated on the process of animal pollination and how pollinators contribute to the production of fruits and seeds, and then asked, “So, what animals are pollinators?” Students responded with familiar examples such as bees, butterflies, moths, and flies, to which I acknowledged their answers and expanded the list to include pollinators that were not mentioned or are lesser-known such as birds, bats, beetles, and even some reptiles and mammals.

“Why do you think animal pollination is important?”

“To help the plants grow.”

“for animals to feed their family.”

* The bold text refers to me or Kaitlyn speaking, and the regular text refers to the students’ responses.

Finally, we explored the essential needs of pollinators for survival, for which I prompted with the hint that it is very similar to what other living things need to survive, and the students confidently identified food, water, and shelter. When children identify commonalities between themselves and others, such as recognizing our shared needs with other species, it becomes easier to establish connections and empathize with those they deem similar (Budnik & Ernst, 2022; Lithoxidou et al., 2017).

In the latter part of the presentation, we delved into the critical role of pollinators in sustaining ecosystems and facilitating food production for other species, including humans. We also addressed the various threats that pollinators face, including habitat loss, pesticide use, proliferation of non-native plants, and impacts of climate change. As ‘pesticide’ might be something unfamiliar to some students, I posed the question,

“Do you know what pesticides are?”

A few students raised their hands, offering explanations such as, “[pesticides] kill the plants and the animals [sic]” or describing them as “a potion that has a type of chemical that you can spray places to kill bugs [sic]”.

When discussing climate change, a student brought up an event they had heard about.

“I think there was a fire in Canada a few months ago.”

“Is it because of climate change?”

“I think so.”



In an attempt to bring the focus of the conversation back to pollinators, I used wildfires as an example of an impact of climate change, highlighting how rising temperatures can lead to the destruction of habitats for many species of animals, including pollinators. As we concluded the presentation, I introduced some types of pollinators found in the state of Rhode Island, which are mainly butterflies, bees, hummingbirds, and flower flies, emphasizing the importance of learning about them and finding ways to support them in our local ecosystem.

We paused the presentation at this point and Kaitlyn took over to lead the discussion. She asked students to share about the things that stood out to them and what they had written or drawn on their worksheets. Lastly, we also discussed some ideas on how we can help pollinators based on what we have learned. Here are some of the insightful responses provided by the students during the discussion and on their worksheets:

“Did you learn anything new from the presentation?”

“I learned about pollinators and the thing that kills plants and all that (pesticides)”

“Without pollinators we can’t have coffee, chocolate, strawberries and other food”

“I’m seeing some really interesting drawings on your paper. Does anybody want to share what they drew?”

“I drew a bee going to a flower and I tried my best to draw a butterfly”

“I drew a butterfly on a flower”

“I drew a bee and butterfly”

“Does anybody have any ideas on how we can help pollinators?”

“We can plant native plants”

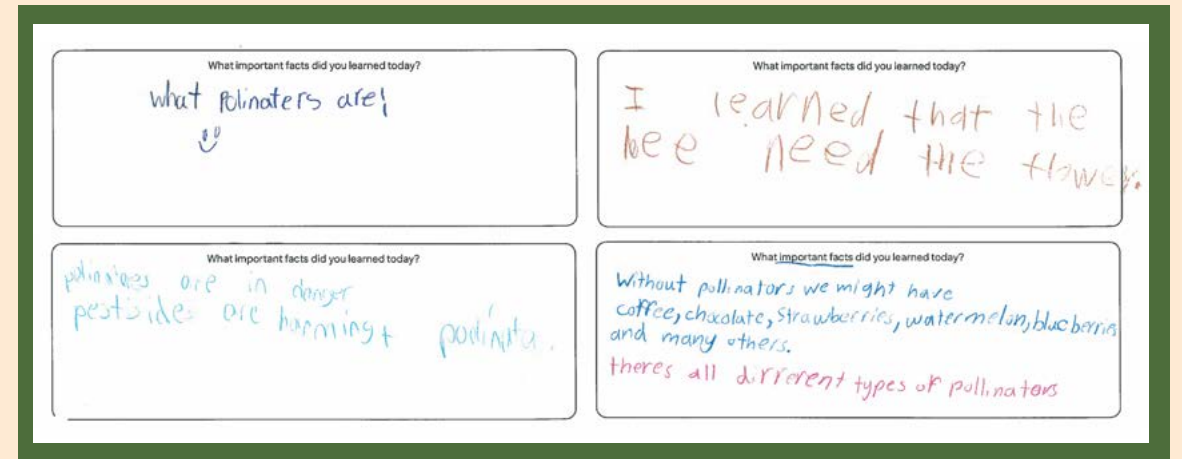
“Try to stop people that kill plants and their (pollinators’) food”

“What is a pollinator? How do they help plants?”



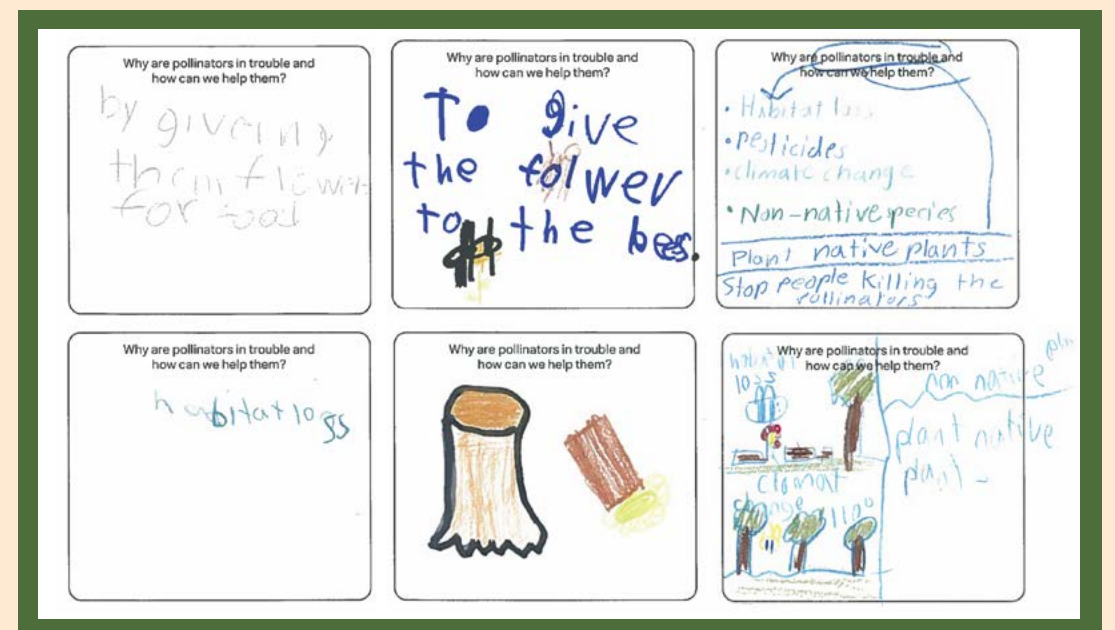
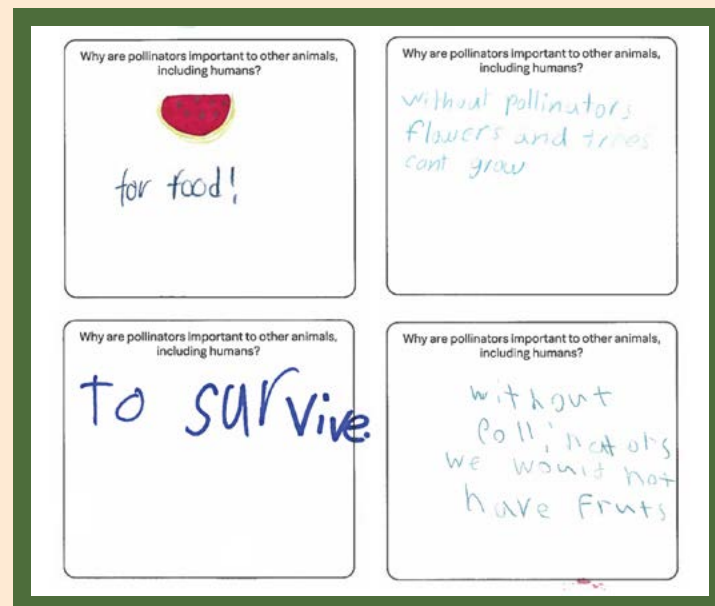
“What are some types of pollinators?”

“What important facts did you learn today?”



“Why are pollinators important to other animals, including humans?”

“Why are pollinators in trouble and how can we help them?”



Before we moved on to the activity, we introduced an artist, Faith Williams, to the students. I first learned about Faith Williams' work through Creature Conserve and found that her work aligns well with the theme of the program, as she has created several works around the topic of pollinators (figure 3.39). Faith employs mixed-media to create various types of artwork ranging from drawings and paintings to interactive installations. We highlighted the different ways that Faith invites viewers to engage with pollinators and to see the connections between them, the environment, and us. Some themes that she explores in her work include the life cycle of pollinators and the relationship between plants, pollinators, and the foods we enjoy. We showed students examples of Faith's work to encourage them to start thinking about what they wanted their collages to be about.

As we transitioned into the art room, Kaitlyn and I introduced the project and materials. There are five tables that had a stack of images of bees, butterflies, birds, bats, and flower flies respectively, and every table also has common materials like scissors, glue, markers, crayons, and colored pencils (figure 3.37a). On the side, we have another table with other materials students are free to use such as paper, old magazines, patterned paper, and other upcycled materials (figure 3.37b). Before the students got started, Kaitlyn showed an example of a collage that she made (figure 3.38).

While the students were working on their projects, Kaitlyn and I walked around the classroom to see if anyone had questions or needed any assistance, and asked students if we could take photos of their art and of them working. While engaging in conversations with the students, we also asked about their ideas and choices they made in their work which most students were eager to discuss.



Figure 3.37a, 3.37b
Classroom setup and materials table



Figure 3.39
Intertwined (2022), Faith Williams
<https://www.faithwilliamsart.com/>



Figure 3.38
Kaitlyn's example collage

Most of the students were very excited about the topic and were very engaged throughout the class. The group of 4th grade students sitting at the bee table expressed their interest in the topic and activity, and their enthusiasm for art in general. I asked them if they had learned anything about pollinators in another class before the presentation, and they said no. So I asked a follow up question, asking them if they knew about pollinators beforehand. As one of the students was working on his collage, he told me that his mom has a garden in their front and back yard where they grow flowers like dahlias, zinnias, and snapdragon, and they get a lot of bees and some butterflies in their garden. He went on to explain, "our street is a dead end, and around the dead end there are honeybees and there are people who make honey from the honey bees, so we get a lot of bees [in our garden]." This student assembled an image of a bee on a flower that he created with different pieces of vibrant patterned paper (figure 3.39).

Another student at this table created an informational collage showing the different types of pollinators and the various plants they help reproduce and the food that we benefit from. She was very invested in the project and strived to include as much information as she possibly put on her paper (figure 3.40).

The last student at this table took a different approach and assembled a scene with various collaged plants, and even included the sky and a lake with a boat in it (figure 3.41).

As I walked around to observe other students, I noticed a student sitting at the bat table using the collage technique to recreate an image of a bat pollinating a flower. He drew the head of the bat and completed the rest of the image using patterned paper that was meticulously cut out and arranged (figure 3.42).



Fig 3.40



Fig 3.41



Fig 3.42



Fig 3.43

Figure 3.40
A student's collage of a bee on a flower

Figure 3.41
A student's informational collage about different types of pollinators and the foods they help grow

Figure 3.42
A student's collaged scene of a bee pollinating a flower

Figure 3.43
A student's collage of a bat pollinating a flower

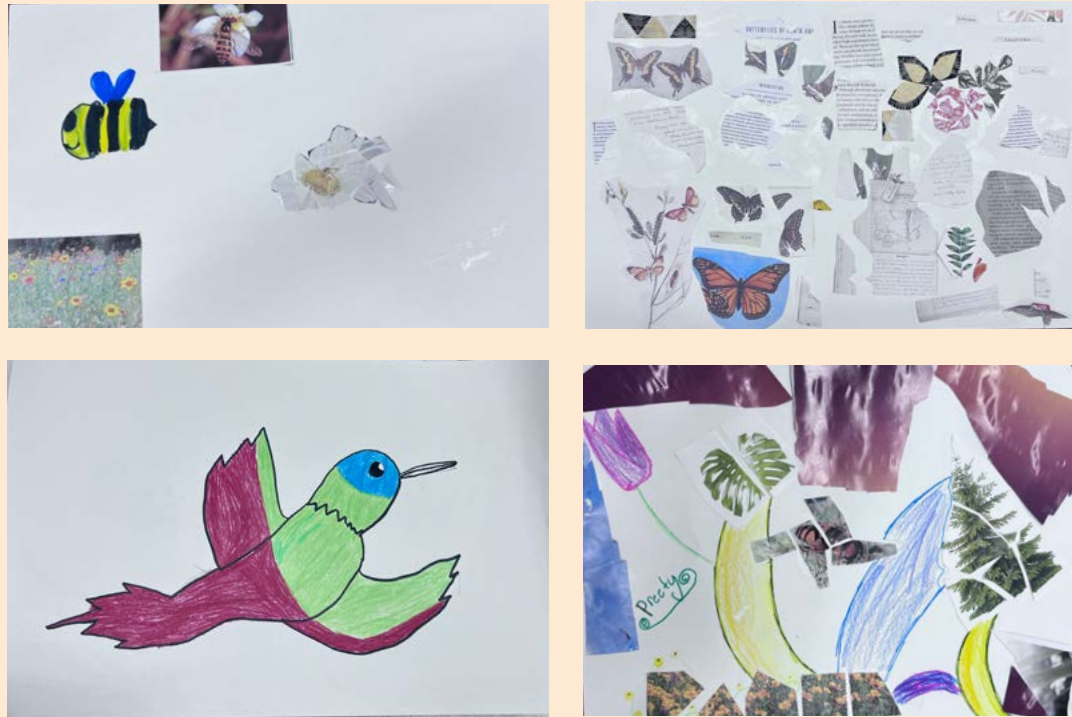


Figure 3.44 More examples of student work

A few students strayed a little bit from the focus of the class on pollinators and incorporated their own ideas and interests into their work. For example, one student drew an image of a penguin wearing a jetpack with a minecraft portal (figure 3.45).

Overall, the students demonstrated high levels of engagement with the information, discussions, and project, producing unique and compelling artworks in response to the information presented. Many students displayed their impressive capabilities of incorporating elements of the knowledge that they gained through the presentation and discussions into their artwork. A lot of them were able to make the connection that we need pollinators to have the food that we enjoy. However, managing the classroom proved challenging at times, perhaps due to my limited experience. There were a few instances where students got distracted, or were having side conversations, and failing to respect their peers and their art time. Following the session, Kaitlyn suggested establishing some class agreements to implement in the next session in order to foster a more focused and respectful learning environment, discussed in more detail in the following section.



Figure 3.45
A student's work depicting a penguin wearing a jetpack, with a minecraft portal next to it

Week 2: Stories for Pollinators

This week, we organized a story creation activity as a way to prompt students to practice empathy through perspective-taking. Rather than engaging storytelling through a traditional format where information is conveyed from a teller to a receiver, empowering students to create their own narratives fosters “active narrative empathy” (Talgorn & Ullerup, 2023, p. 19) and enables them to engage with the topic in a way that is meaningful to them. To maximize the amount of time that students have to work on their projects and allow some time to discuss class agreements at the beginning of the session, Kaitlyn and I decided to not do a presentation this week. We had students who were absent the previous week, so we started the class with a round of introductions and an icebreaker question, “What is your favorite pollinator?” or “Do you know what a pollinator is?” Many students mentioned bees, butterflies, moths, bats, and even specific species like monarch butterflies.

Kaitlyn led a discussion about class agreements to address behavior through a trauma-informed lens using positive reinforcement and agency rather than pushing discipline. We made sure to emphasize that the students are not in trouble for anything that they did the previous week, rather this was an important conversation that we wanted to have so that we can set up clear expectations in the classroom. Some of the points that we brought up included respecting peers, respecting and being careful with materials, as well as respecting our art time. Students were welcome to add their ideas at any point during the class.

Afterwards, I initiated a discussion, prompting students to recall what they remembered from the previous week's session. Many students eagerly raised their hands, offering responses such as “we made collages” and “we learned about pollinators.” As a follow up, I asked them to share what they remember from the previous week.

“What do you remember about pollinators?”

“They are important to our ecosystem because without pollinators we won't have fruits, vegetables, and flowers.”

“I think something bad is happening to the pollinators.”

“Their homes are getting destroyed by pesticides.”

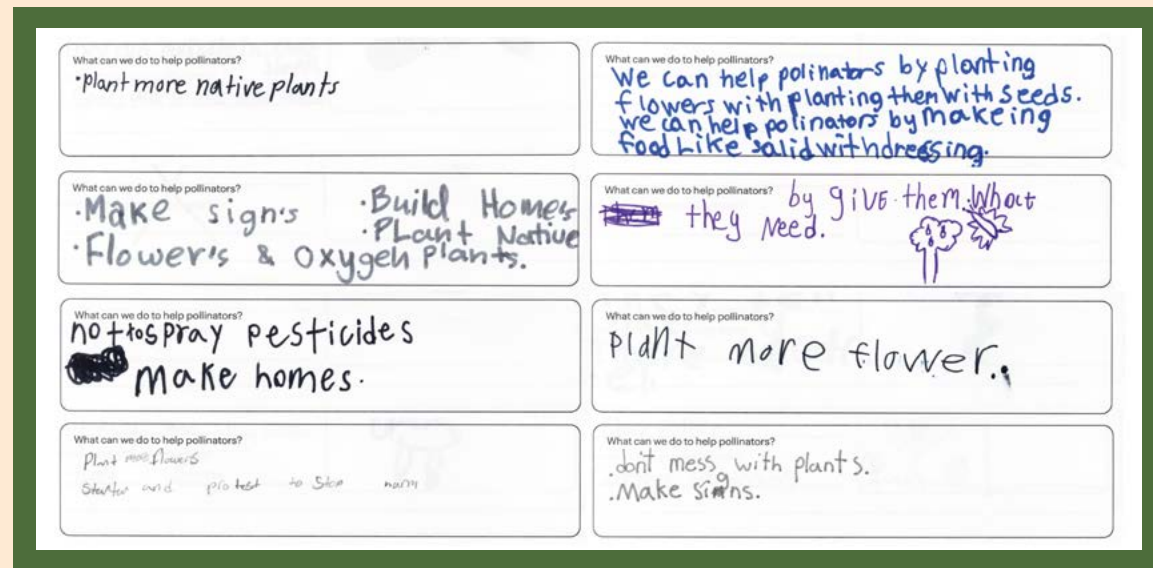


As Kaitlyn passed around the worksheets, I quickly went over important points we discussed the previous week, highlighting some threats that pollinators face. While talking about climate change, a student asked, "Are snowstorms caused by climate change?" to which I explained that climate change is a possible cause of snowstorms, especially when they occur at unusual times of the year. It was April at the time when we were having this class, and there had been a snowstorm on the east coast recently.

Before introducing the project, I got the students to brainstorm ideas for ways that we can help pollinators. One student suggested making signs to educate others about them. As a reminder, I reiterated the point that just like us, pollinators need air, food, water, and shelter to survive, but it is increasingly difficult for them to access these resources. I listed some other examples like building homes for pollinators, planting more native plants in our garden, and creating more natural spaces. As a transition into the activity, we engaged in more imaginative exercise, prompting students to think about what they would say if they could talk to a pollinator. This approach was intended to help children foster empathy for pollinators through anthropomorphism, which is a common way through which they explore and make sense of the world (Beery et al., 2020). Some students came up with creative questions such as, "can you be my pet?", "can you make me honey?", and "how are you butterflies so beautiful?" Moving on, we discussed what hopes and wishes students may have for pollinators. One student said she wishes "that their homes stop getting destroyed," while another approached it with more humor, saying that he wishes "for them to become human-sized."

Below are some examples of their worksheet responses:

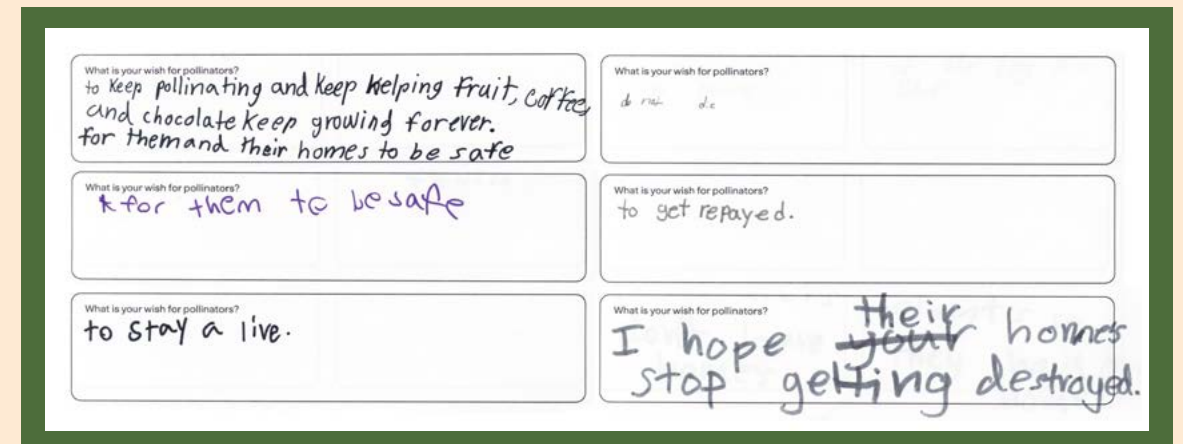
"What can we do to help pollinators?"



"If you could talk to a pollinator, what question would you ask it?"



"What is your wish for pollinators?"



Finally, I introduced the next section of the worksheet, which contained a story-planning template. I walked the students through the project, explaining how they can use the worksheet to plan their story. As I described the project, I encouraged students to reflect on what we have been learning about pollinators and emphasized that we were creating a story to share with others who might not know about pollinators. Research shows that “story making is known to stimulate multidisciplinary collaboration, idea and emotions sharing, new perspective taking, out-of-the-box thinking, and collective sense making” (Talgorn & Ullerup, 2023, p. 2). To help them brainstorm ideas for their story, I asked some guiding questions which they can also find on their worksheet: Where is your story taking place? Who is the story about? Is your character a pollinator, a human interacting with pollinators, or could the story be written from the perspective of a flower? Do they have any special skills or hobbies? What is their personality like? What happens to them or what is happening in the story? Additionally, I reminded students that they had limited pages for writing and drawing, so the story should be concise.

Kaitlyn and I had also brought in some samples of taxidermy butterflies, moths, bees, beetles, and dried plants from the RISD Nature Lab* (figure 3.47). We allowed students to use them as references when designing their characters for their story, but to be extremely careful and gentle when handling them because they are fragile.

* The Nature Lab is a space on RISD's campus with resources for students to study a variety of living and non-living natural specimens, equipped with over 80,000 natural science specimens, microscopy and micro-imaging systems, and laboratory equipment. Visit <https://naturelab.risd.edu> for more information.



Figure 3.46
Materials set up on each table



Figure 3.47
Specimens from RISD Nature Lab

At this point, the class started getting busy and we encountered some challenges in terms of classroom management and student engagement. Throughout the session, students would occasionally get up out of their seats and were overly energetic and restless in general. Reflecting on the session, I think that we could have mitigated some of these issues by incorporating a more compelling hook and maintaining a consistent lesson structure. Beginning the class in the art studio seemed to distract some students as the materials were already laid out on the table prior to the session. Some students misused the materials, notably the taxidermies, and treated them more like toys rather than fragile objects. While nothing was broken, we did notice that the class was not as focused as they were before. From time to time, Kaitlyn and I reiterated some of the class agreements through verbal reminders and checked in with students individually to address any concerns. This was usually helpful to prompt them to return to their seats and turn their focus back onto the project.

While explaining the project, I made an effort to highlight the character design aspect of the story to introduce opportunities to practice empathy through perspective taking. However, in hindsight I recognize that it is possible that some students felt overwhelmed or

overstimulated by the amount of questions I posed to help prompt ideas, causing them to lose focus and motivation instead. Kaitlyn noted that a few students struggled to understand some of the words on the worksheet and got confused about the lesson. For example, a few students needed further explanation on what “motivations” and “personality traits” mean. Additionally, some students left their worksheets completely blank, or only drew their character, suggesting a need for better clarity in presenting instructions or providing additional support (figure 3.48). Based on Kaitlyn's observation, she identified three groups among the students who needed more support, with students falling in one or more of these categories. The first group appeared confused about the lesson initially but responded well to redirection and regained interest with repeated instructions or guiding questions. The second group struggled with developing their story ideas and benefitted from constructive encouragement and prompts to inspire their creativity. Finally, the third group required more guidance with translating their abstract concepts into something tangible and/or channeling their energy into their work. Additionally, compared to the previous week's activity, we provided fewer materials for students to work with, which may have contributed to disinterest in some students due to understimulation.

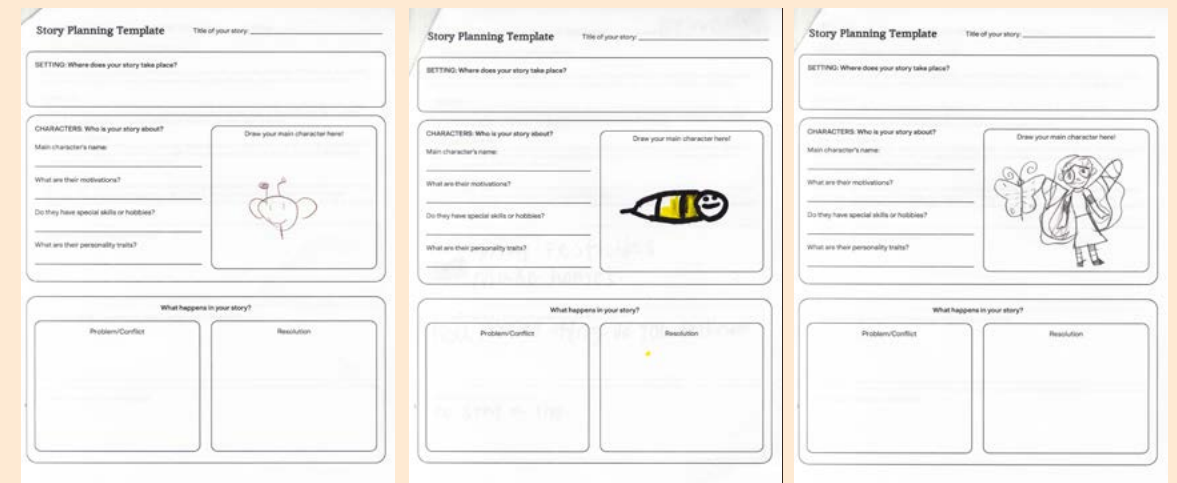


Figure 3.48 Incomplete worksheets

Aside from issues with classroom management and student engagement, another challenge arose from a lack of clarity or structure during the lesson. Initially, I had allocated around 15 minutes for students to work on their story planning worksheet, assuming that they would require that amount of time to complete it. However, some students finished earlier than we expected and were eager to move on to the next step. Unfortunately, due to some miscommunication and the busy class environment, I was unable to instruct those who have finished to wait for their peers or to redirect the class to the demonstration if most of them were ready to move on. This resulted in Kaitlyn and me scrambling to assist each student with folding their zines as they finished their worksheets at different times. These are all things that we need to take note of when we plan and make adjustments for the next class.

As we began to better understand and build trust with the students we were working with, Kaitlyn and I were able to provide additional tailored support and redirection to students who were struggling, and most of them were able to proceed to work on their projects. The students created a variety of stories - some of which were directly related to the topic, while others used pollinators as the characters of their story but told a narrative that was unrelated to the things we have been discussing.

The three 4th grade students who were sitting at the bee table in the previous week completed their work diligently and even collaborated with one another to feature their character in their peer's book. One of them created a story of a bee named Milo and his best friend Butterfly who learn how to plant their own flowers for food and shelter from a human named Jake (figure 3.50). His story is as follows:

Once there was a bee named Milo who loved pollinating flowers! He had a best friend named Butterfly. Where Milo lived it was very hot and there were enough flowers to last 2 lifetimes. But then flowers started disappearing, so Butterfly and Milo tried to learn to plant flowers from Jake. Milo and Butterfly thanked Jake and planted seeds and told other bees.

Through his story, he demonstrates a thoughtful understanding of the needs of pollinators and the threats that they face, such as the impact of rising temperatures and habitat loss. His creative solution to sustain pollinators by teaching them to plant their own flowers reflects both critical thinking and empathy. I also noted the specificity of the story's setting, compared to other students who have more abstract or imaginary settings such as an unnamed garden, forest, or front/back yard (figure 3.49). Through my observations from the previous week, this student's engagement with the material appears to stem from personal connection, such as mentioning his mom's garden during the previous session. Although he did not mention it explicitly, his choice to set the story in Santa Fe, New Mexico, may be similarly influenced by personal experiences or connections to the place.

Story Planning Template Title of your story: _____

SETTING: Where does your story take place?
 Santa Fe in a garden full of bees, New Mexico

CHARACTERS: Who is your story about?
 Main character's name: Milo
 What are their motivations? To pollinate and to keep flowers safe
 Do they have special skills or hobbies? pollinating, and maintaining
 What are their personality traits? fun, friendly, funny, teamwork

Problem/Conflict: Flowers are disappearing
 Resolution: the bees learn how to plant flowers

Figure 3.49 Story planning worksheet for 'Milo the Bee'



Figure 3.50 Student's work: 'Milo the Bee'

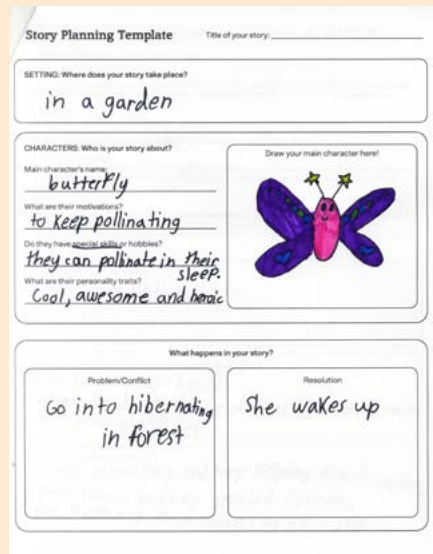


Figure 3.51
Story planning worksheet for butterfly story

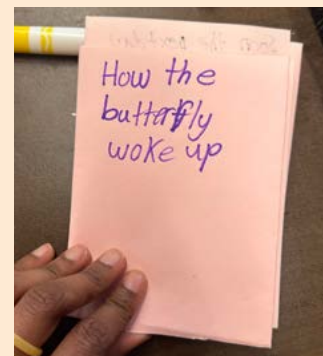
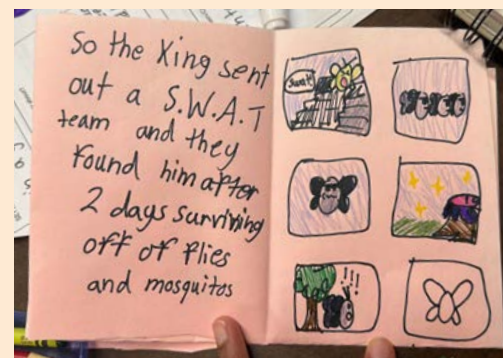
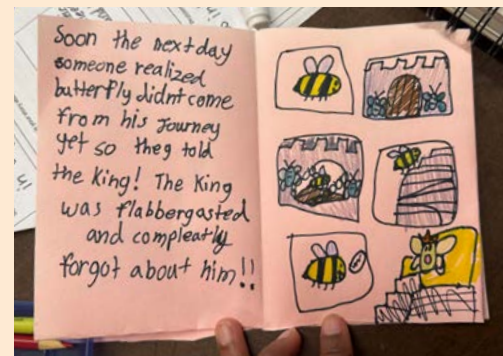
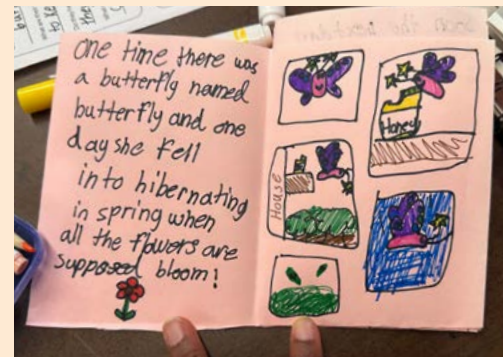


Figure 3.52
Student's work about a butterfly (untitled)

Another student at the table created a story with the butterfly as the main character (figure 3.52). Her character was featured on the second page of the previous student's story, 'Milo the Bee'. This student's story was set in a world of pollinator characters, namely butterflies and a bee which is possibly a reference to 'Milo the Bee'. In the story planning worksheet, she listed that her character, Butterfly, has special abilities that allows them to "pollinate flowers in their sleep" and that their motivation is "to keep pollinating" (figure 3.51). Although the story does not explicitly address the process of pollination or the challenges pollinators face, the student was able to build on her understanding about pollinators and integrate it with her creative ideas and humor to craft a compelling narrative. She told me that she was not done with her story, but that her story will end with Butterfly waking up.

One time there was a butterfly named butterfly and one day she fell into hibernating in spring when all the flowers are supposed [to] bloom! Soon the next day someone realized butterfly didnt come from his journey yet so they told the king! The king was flabbergasted and completely forgot about him!! So the king sent out a S.W.A.T team and they found him after 2 days of surviving off of flies and mosquitoes.

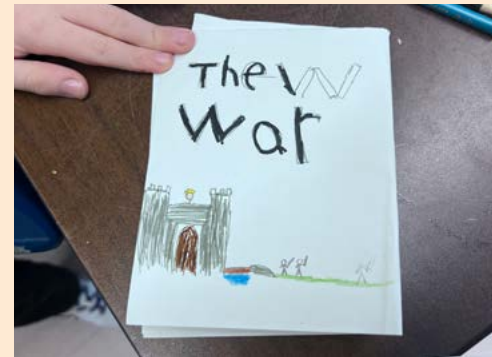


Figure 3.53
Student's work: 'The War'



Figure 3.54
Students working collaboratively while creating their own stories

The last student at this table created a story that was completely unrelated to the topic of pollinators. However, as Kaitlyn has observed, he chose to depict characters from his sketchbook in his story about a knight (figure 3.53). Even while he was working on his independent project, he collaborated with his classmates by drawing one of his characters for the human character, Jake, in 'Milo the Bee' (figure 3.50). This student has consistently demonstrated enthusiasm and dedication to the class, expressing his keen interest in art to both Kaitlyn and I, often sharing pages from his personal sketchbook.

At the next table, a group of students remained focused on their projects throughout the session, diligently crafting unique and engaging stories involving pollinators or featuring them as characters. One student in particular created a book called “What Pollinators Do” [sic] (figure 3.56), showcasing her understanding of the vital role pollinators play in the ecosystem as food producers. I was particularly fascinated by her ability to draw connections between pollinators in her front yard to their larger role as food producers “for the entire world.” She even began to write about the issue of habitat loss which causes pollinators to lose their homes, but was unable to complete her story during the duration of the class. Her story begins with this:

In my front yard there are a lot of pollinators, for example, bees. The pollinators produce food for the entire world. But some of the pollinators don't have homes.

In the story planning worksheet, similar to the plot of ‘Milo the Bee’, the issue of pollinators not having enough homes is resolved by “pollinators plant[ing] more plants so they have a home” (figure 3.55).



Figure 3.56

Student's work: 'What Pollinators Do' [sic]
Student's name was redacted for privacy

Figure 3.55
Story planning worksheet for 'What Pollinators Do' [sic]

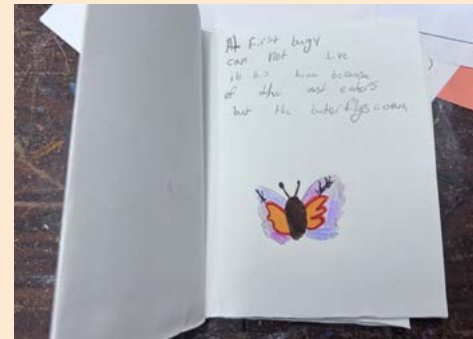


Figure 3.57 Student's work: 'A Bugs Life'



Figure 3.58
Story planning worksheet for 'A Bugs Life'

The other two students at this table created stories that were not as directly related to the focus of the class, but they featured pollinator and plant characters in their stories. One of them created a book titled, “A Bugs Life” (figure 3.57) which tells the story of a butterfly who was forced to move out because of an anteater and flew across the sea, and eventually returned to its home. She revised her story from the planning worksheet, where she wrote that the problem or conflict is that the character “got fired, no job no more,” which gets resolved by the character “[getting] back a job at the toyota shop” (figure 3.58) I struggled to read the handwriting of this student, but I think this is how her final story goes:

At first bugy [sic] cannot live in his house because of the anteaters but the butterflies come. So they ate the honey. So they go at the [sic] sea and go to the ocean side. He gets up and goes to his home back across the sea. And he got back to his house and the ant eater died.

Despite the narrative being unrelated to the class content, I noticed that she integrated some central themes discussed in the class, such as centering the story around a butterfly character and introducing a conflict related to the character's home.

Another student at the table created a story called "The Bee and the Flower" (figure 3.60). While the story features a flower and a bee as the main characters, the narrative focuses on the concept of consent. The story is about the flower not allowing any pollinator to get her pollen, but ultimately she allowed the bee to get her pollen. Her story goes:

There was a flower that would not let any pollinator get her pollen. Until a bee came? And she said 'NO!' (the bee says 'Sorry'). She [felt] bad so she said fine.

Story Planning Template Title of your story: the Bee and flower.

SETTING: Where does your story take place?
forest.

CHARACTERS: Who is your story about?
Main character's name:
Daisy and Jhony
What are their motivations?
The Bee.
Do they have special skills or hobbies?
Blow Pollen.
What are their personality traits?
Caring Wandering

What happens in your story?

Problem/Conflict <u>She wont let him pollenate</u>	Resolution <u>he tells her why</u>
---	---------------------------------------

Figure 3.59
Story planning worksheet for 'The Bee and the Flower'



Figure 3.60

Student's work: 'The Bee and the Flower'
Student's name was redacted for privacy

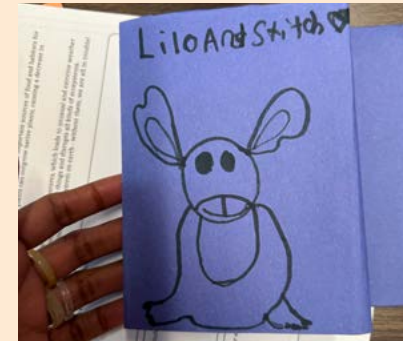


Figure 3.61
Student's work about Lilo and Stitch (untitled)

At another table, one student initially seemed confused and uncertain about the lesson while crafting her story. She began by using the materials to draw things she liked and expressed an interest in creating a book about Lilo and Stitch. However, on one of the pages it can be seen that she started to integrate her interests with the class topic, as seen from the words "important" and "butterfly" on her book (figure 3.61).

Her friend who was sitting at the same table understood the lesson but occasionally got distracted by the other two students at the table who invited her to play. With some reminders and guidance, she was able to redirect her focus on the project and even encouraged her friends to do the same. She created a book called 'All About Pollinators' (figure 3.62) and started off with a page that highlights the importance of flowers as a resource for bees and butterflies. In the first spread she writes, "The flower are important for the bee and the butterfly."

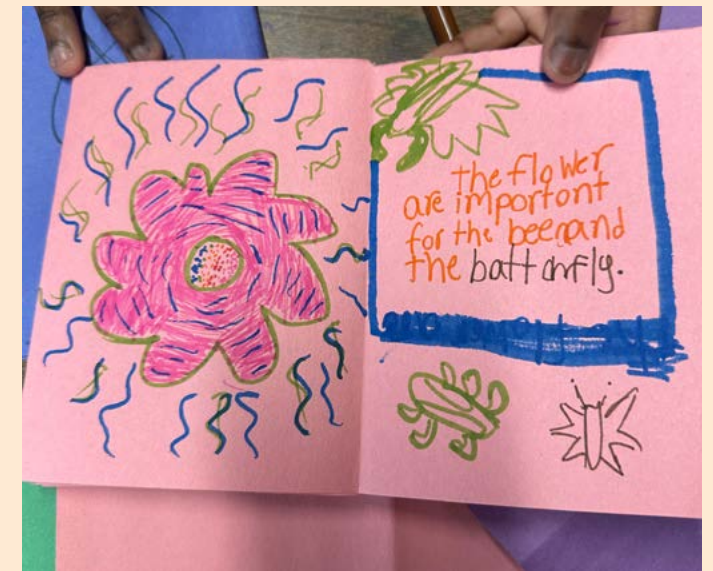
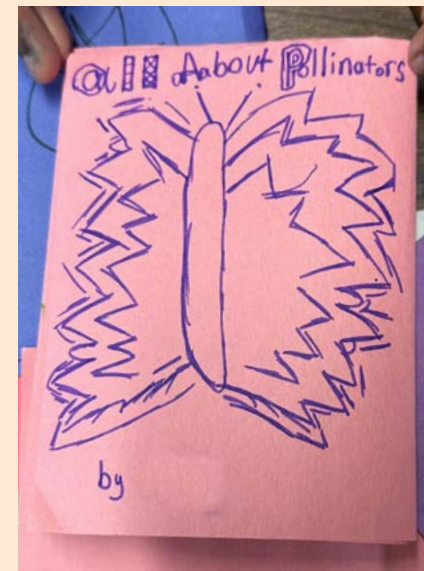


Figure 3.62 Student's work: 'All About Pollinators'

Another student who, since the first session, required a more tailored support was confused about the project and needed some guidance to proceed with the project. The after-school program coordinator and a teacher who visited the class mentioned that he is neurodivergent and needs more attention and assistance. With this in mind, Kaitlyn and I checked in with him from time to time to make sure that he was on track, but he would also often approach us for help when he needed it. He seemed quite uncertain about how to fill out the story-planning worksheet and would seek affirmation from me or Kaitlyn to make sure he is doing his task correctly. During this session, Kaitlyn was able to provide one-on-one guidance for him, which helped him stay on task. Although he struggled to understand some words on the worksheet, he was able to come up with great ideas and demonstrated a foundational understanding of the needs of pollinators. He created a book about a butterfly that says: "Main character's name is Butterfly. The Baterfly [sic] is flying around" (figure 3.64).



There were a group of students who either did not engage in the project or created stories that were completely unrelated to the class. Those who remained interested in the activity chose to incorporate their own interests rather than adhering to the theme of pollinators. For example, one student created a story about a boy who saved the world from a flaming meteor that was falling to earth. In his narrative, the boy sends the meteor back into space by striking it with a baseball bat. Although the student may have been uninterested in creating a story about pollinators, his work showcased his enthusiasm for storytelling and his ability to inject creativity and humor into his work. He was particularly excited to share his creation with the class at the end of the session. The other students who were disengaged might have benefited from more structured guidance or support at the beginning of the session to help them focus their energy on the project and find elements within the theme that they can connect with and get excited about.

They utilized various storytelling techniques, primarily anthropomorphism, which is an effective method for developing empathetic skills (Talgorn & Ullerup, 2023) as it encourages children to attribute intrinsic value to natural, non-human entities such as plants and animals (Lithoxidou et al., 2017).

Throughout the session, it became clear that many students in this age group prefer hands-on or kinesthetic activities and thrive when given more choice and freedom regarding the materials available and the flexibility of the final product's format. Compared to the first session, the activity we planned for this session was adaptable and open-ended compared to the first as everyone was instructed to create a book, potentially leading some students to feel lost or frustrated by their inability to fully express their ideas and creativity. In hindsight, we could have offered other avenues of storytelling for students who were not interested in working with the format of a book. Overall, this experience helped us get to know and better understand the students we were working with, allowing us to identify those who required more immediate support and guidance. Kaitlyn and I took all of these insights into consideration while preparing for the next and final session of the program so that we can facilitate a more productive and enjoyable experience for the students.

Story Planning Template Title of your story: _____

SETTING: Where does your story take place?
to the BACKYARD.

CHARACTERS: Who is your story about?
Main character's name: BUTTERFLY
What are their motivations? to survive.
Do they have special skills or hobbies? they fell nice.
What are their personality traits? there are bees, etc.

Draw your main character here!

What happens in your story?

Problems/Conflict: if there is no planter they will die.

Resolution: We will give them a flower.

Figure 3.63
Story planning worksheet for a story about a butterfly in the backyard (untitled)

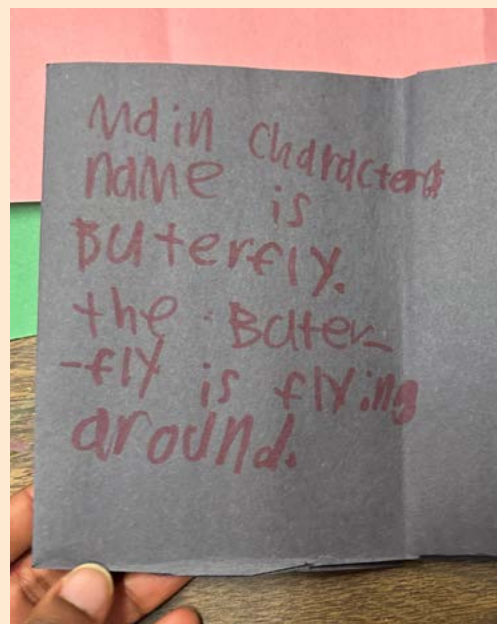


Figure 3.64
Student's work about a butterfly (untitled)

Despite the challenges we faced this week, the students created unique and creative stories, most of which aligned with the theme of the class and others veering slightly off-topic. Nonetheless, most of the students had a wealth of ideas and displayed their enthusiasm for storytelling, showcasing their impressive abilities. Given the limited session time, many students were unable to complete their projects during the class period, and we encouraged them to continue their work at home. Even with the constrained time frame, their work demonstrated a solid foundational understanding of pollinators and the pollination process, and various ways of integrating the topic with their own interests in response to the ideas we discussed the previous week and at the beginning of the session. Some students went further to address challenges that pollinators face and proposed solutions such as teaching pollinators to plant their own plants, demonstrating empathy by attempting to problem-solve from the pollinator's point of view.



Week 3: Designing a Garden with Empathy

This week, we decided to follow the structure of the first week and start off with a presentation in the library to avoid students getting distracted by the materials in the art studio. We began with introductions and an icebreaker question as usual, asking students what their favorite place in nature is. Many students mentioned that they like places such as forests, woods, lakes, and ponds, with some going on to share their experiences visiting those places.

Before the lesson, Kaitlyn provided a brief overview of the activity for the day: creating three-dimensional dioramas. This sparked excitement among the students, prompting some of them to share past experiences of making dioramas for other classes. As the students settled down, we introduced them to the work of multidisciplinary artist Dr. Alexandra Daisy Ginsberg, to introduce the concept of gardening with empathy. We began by asking the students if they were familiar with empathy, to which one student mentioned it had something to do with “feelings.” “Do you know what specifically it has to do with feelings?” Another student suggested that empathy might involve “feeling how someone else feels.”

We then discussed Dr. Ginsberg’s work, *Pollinator Pathmaker*, a digital tool that she created integrating art and technology to design gardens with empathy for pollinators. In this context, empathy was defined as designing a garden with plants that support as many pollinator species as possible, prioritizing elements that meet the needs of pollinators over human preferences or aesthetics.



As Kaitlyn explained how Dr. Ginsberg practices empathy in the process of creating her work, she invited the students to share how they practice empathy in their everyday lives:

“What are some ways that you use empathy in your own lives?”

“If my friend falls off his bike, I will get off my bike to help him.”

“If my friend gets hurt, I don’t laugh at them.”

Kaitlyn underscored the way that these examples demonstrate the students’ consideration for others’ feelings, then posed another question to bring the focus back on pollinators.

“So, what are some ways we can consider how pollinators feel when we are creating a garden?”

“We can make them happy”

“(adding to the previous student) by being considerate.”

“Don’t pick the flower while they are trying to pollinate it.”

After introducing the artist and discussing what empathy means, the students were given the opportunity to design their own garden through a drawing activity with the prompt: “**What does a garden planted with empathy for pollinators look like?**” To assist them in brainstorming ideas, I shared some examples of how to garden for pollinators, such as growing native plants, planting flowers in different shapes, and creating resting places for pollinators. While they worked, Kaitlyn and I walked around to ask the students about their ideas. One student eagerly shared her plan to create a “museum garden” for butterflies and bees, while another described her drawing of a lemonade stand to provide drinks for pollinators. A different student explained his detailed greenhouse design containing various plants, complete with a misting system. Another student drew a garden with a scarecrow, while some students depicted a scene in the forest. We gave the students a few minutes to fill in their worksheets before proceeding to the art room for the main project.



Figure 3.65
Pollinator Pathmaker (2021- ongoing), Alexandra Daisy Ginsberg
<https://www.daisyginsberg.com/work/pollinator-pathmaker>

a: Pollinator Pathmaker in Eden Project
https://artterritory.com/en/visual_arts/topical_qa/25837-pollinator_pathmaker_the_largest_ever_climate_positive_artwork/
b: Digital rendering of Eden Project Vision (2021)
c: Digital Rendering in pollinator vision (2023)



Figure 3.66 Students' responses to "What does a garden planted with empathy for pollinators look like?"

Given that some students had trouble with the worksheets in previous weeks, we decided to simplify this week's worksheet to include only one prompt. Originally, we intended to include additional prompts like "Write or draw what empathy means" and "How can we have empathy for pollinators?" However, we chose to exclude them and address them through classroom discussions instead in order to save time and avoid confusion.

As the students settled down in the art room, Kaitlyn showed the students an example of a diorama that she made to spark ideas for their projects (figure 3.67). We then introduced the materials available for them and instructed them to pick a box to use as the base of their dioramas. Kaitlyn and I made sure to prepare a variety of materials to give students more choices and agency to express their ideas, allowing the project to be more open-ended than the previous week's. We collected cardboard boxes of various shapes and sizes to bring into the class, including shoe boxes, mailing boxes, and packaging. We also brought in a wide variety of craft materials, reclaimed materials, and natural materials students could add to their dioramas (figure 3.68), encouraging them to engage in the process of reinvention and meaning-making (Eckhoff & Spearman, 2009). Each table was also set up with drawing and coloring materials, scissors, and glue. I think that the tactile and kinesthetic nature of the activity—similar to the collage activity in week 1—appealed to the students more than the zine-making activity from the previous week.



Figure 3.67 Kaitlyn's example diorama of a garden created with empathy for pollinators

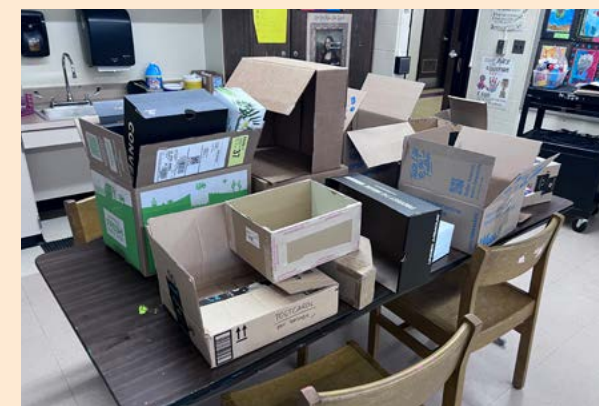


Figure 3.68 Materials for making dioramas



Additionally, we also made a point to check in with students whom we had previously identified as needing extra guidance and support at the beginning, ensuring they understood the project and felt confident moving forward. These factors, coupled with the higher interest in the activity, led to the students being more attentive, diligent, and focused this week, with only a few instances of minor distractions which required occasional interventions and verbal reminders from Kaitlyn or me.

While the students were busy working on their projects, Kaitlyn and I went around the classroom to check in with them individually as usual, asking them about their ideas and processes and offering assistance if needed. We found that most students were deeply focused on their work and had a clear sense of purpose, with some of them enthusiastically approaching us first to ask for advice or assistance with getting materials. Some students would also ask, "Do you like my work?" and share about their process excitedly.



Figure 3.69 Students' work-in-progress



Figure 3.70 Student's beehive design with grass and honey



Figure 3.71 More examples of students' dioramas

One significant observation was that the group of students who seemed uninterested and easily distracted during the second week showed more eagerness to engage with the activity this week. With the additional structured support and check-ins we provided at the beginning, the students maintained their focus throughout the class and created innovative pieces that aligned with the prompt. For example, a student designed a beehive for bees to rest in, incorporating stones, green wool to represent grass, and even the honey that they made (figure 3.70). He proactively asked for specific materials, such as paint, and creatively decorated the exterior of the box to resemble a bee. His friends at the table also remained engaged this week and created their unique interpretations of a garden for pollinators (figure 3.71).

Another group of students who were easily distracted during the previous week also remained focused and engaged throughout the class. One student, who had been unsure about the project last week and did not complete her work, created a beautiful diorama that featured a waterfall (figure 3.72). At the beginning of class, this student had mentioned that her favorite place to be in nature was at a waterfall. Another student at this table created a diorama with a painted backdrop featuring a bright blue sky with fluffy white clouds, and a field of grass (figure 3.73). When I asked her what the pom-poms represent, she said that they were the flowers.

While most students chose to stick things directly to the surface of the box, one student was immersed with building things using less conventional materials such as a paper roll which he turned into the trunk of a tree, and foam which he used to make the base of a picnic table, a bush, and a beehive on the tree (figure 3.74). He also attached the felt bee onto a pipe cleaner to make it look like it is floating.

It was interesting to observe the students' unique creative choices in their work (figure 3.75). Many of them used a collage approach (which we introduced in Week 1), incorporating elements like images cut up from old magazines, patterned paper, felt, and fabric to build compelling scenes. Some students used images of mountains, houses, or skies as backdrops for their dioramas, or creatively simulated grass fields and walking paths with felt and other fabrics. Some students used a combination of paint and collage, while others chose to only use collage techniques.



Figure 3.72
Student's diorama with a waterfall in the background



Figure 3.73
Student's diorama with pom-poms that represent flowers



Figure 3.74
Student's diorama featuring a tree with a beehive



Figure 3.75 More examples of students' dioramas

The only student who created a diorama with a different theme was the neurodivergent student who required additional assistance in previous weeks. Kaitlyn and I made an extra effort to keep an eye on him and frequently check in with him during the session. Although he was eager to participate in the activity, he chose to create an ocean scene, which was still loosely related to the class's theme, as it represented a natural environment (figure 3.76). He seemed to be less unsure and more comfortable with the project and maintained focus throughout the session. He was excited to work with the materials and proactively approached me or Kaitlyn when he needed help or advice, like when he wanted to mix colors. When we asked students to share their work with the rest of the class at the end, he enthusiastically volunteered and even engaged his classmates by asking, "Before I show you, can anyone guess what's inside?" His peers made a few curious guesses before he opened the box to reveal his creation. Even though his diorama differed from the class's theme, I was glad to see him embrace the idea of designing a natural space, integrate his own interests, and have fun with the project.



Figure 3.76
Student's ocean scene diorama

Overall, the students seemed to really enjoy this week's activity, and everyone created beautiful and unique solutions for designing a garden with empathy for pollinators. Due to the limited time, some students were unable to complete their projects but expressed an interest in continuing to work on them at home. This activity seemed more appealing and age-appropriate because it combined a creative problem-solving challenge with hands-on/kinesthetic learning, which appeared to resonate well with this group. The students did a great job at considering how their placement of plants and types of plants they include in their garden would impact the pollinators that would come into the space or the relationships that could be fostered in the space. For example, a student made "a park that's made for pollinators and humans," another made "a garden for pollinators to live," and another student wanted "pollinators, animals, and Stitch (from Lilo and Stitch)" to visit her garden. Kaitlyn and I observed that the students thrived with having choice and agency in the use of materials, and benefited from having a wider variety of mediums to work with. We also noticed that the students were encouraging one another as they were working and enjoyed talking to one another about their process. During the session, one student said, "Why does time fly when you're having fun?" Many students were sad that this was the last session and wished that they had more time to finish their work. I am so glad that the students enjoyed the sessions as much as I did facilitating the class!

Concluding Thoughts & Reflections

Through these Mini Makerz sessions I aimed to cultivate empathy for nature to foster ecoliteracy through art education by providing unique opportunities for students to learn about and connect with non-human animals in a rather unconventional way. By integrating artistic expression with topics that are traditionally presented through dry non-fiction, students can engage with them on a more personal level. As many have noted (Hawkman et al., 2022; Harper, 2016; E. Fishman, personal communication, April 1, 2024), young students possess the capacity to engage with complex ideas and formulate nuanced perspectives about issues such as wildlife conservation and climate justice, if facilitated in an age-appropriate manner. From my experience and observation, elementary school curricula often treat students like sponges that only absorb information, leaving little room for students to develop their curiosity and their own individual responses to the material they are learning about. Art, however, serves as a powerful medium that not only encourages creative expression but also has the potential to facilitate more effective and enjoyable learning experiences by engaging the "whole child" (Thomas Lickona, 1991, as cited in McCarthy, 2020, p. 4), thus potentially fostering community engagement and positive long-term impacts and action. I want to emphasize that my approach to the sessions was centered on observing how students responded to the material (intellectually, socially, and emotionally), rather than focusing on whether they understand it perfectly or got it "right or wrong." I believe that this approach alleviates the pressure to perform well and places the emphasis on learning together as a community, while centering student voice and creativity.

The few sessions we had revealed to me that young students are genuinely interested in engaging in activities and discussions about ecology. Many of the students I interacted with already possessed a keen interest in various animals or environments prior to our classes. They exhibited a high level of engagement and understanding about topics related to the impacts of human activity on non-human animals. Furthermore, the students produced remarkable artwork and proposed creative solutions to these ecological issues, showcasing their empathy towards non-human animals by considering the perspectives of other creatures such as pollinators and marine animals. While their work may still primarily reflect a human-centered viewpoint



(such as designing a lemonade stand for pollinators or suggesting marine creatures move to the desert to avoid plastic pollution), it nonetheless signifies a step towards nurturing an empathetic perspective towards the natural world which can lead to the development of emotionally and socially engaged ecoliteracy (Goleman et al., 2012). Activities that encourage children to exercise empathy and employ creative problem-solving skills to consider the needs of others lay the groundwork for deeper understanding and compassionate action towards the natural world.

Through my teaching experiences, I learned the importance of prioritizing a student-centered approach to foster empathy among young learners. Here are my key observations and takeaways:

1. Young children are indeed capable of thinking about and engaging in conversations about complex ecological issues. It is important to embrace their innate curiosity and provide a safe space for them to share their thoughts and questions.
2. Establishing a strong hook or point of connection with topics that interest students is crucial for engagement. By tapping into their interests, it would be easier to capture their attention and motivate them to actively engage with the material.
3. Hands-on and kinesthetic activities that offer choice and agency tend to resonate better with younger students, empowering them to actively participate and take ownership of their learning experience.
4. Younger students thrive in activities that promote creative problem solving while providing a balance between structure and open-endedness.
5. Activities that encourage imagination and perspective-taking serve as accessible ways for young students to understand the concept of empathy. (For example, asking questions like “How would you feel if you were a fish swimming through an ocean full of waste?”)
6. It is important to be flexible to adapt to the interests and learning style of the group.



Figure 3.77
Students' work-in-progress

In reflecting on areas for improvement for future sessions, I have also identified some key points:

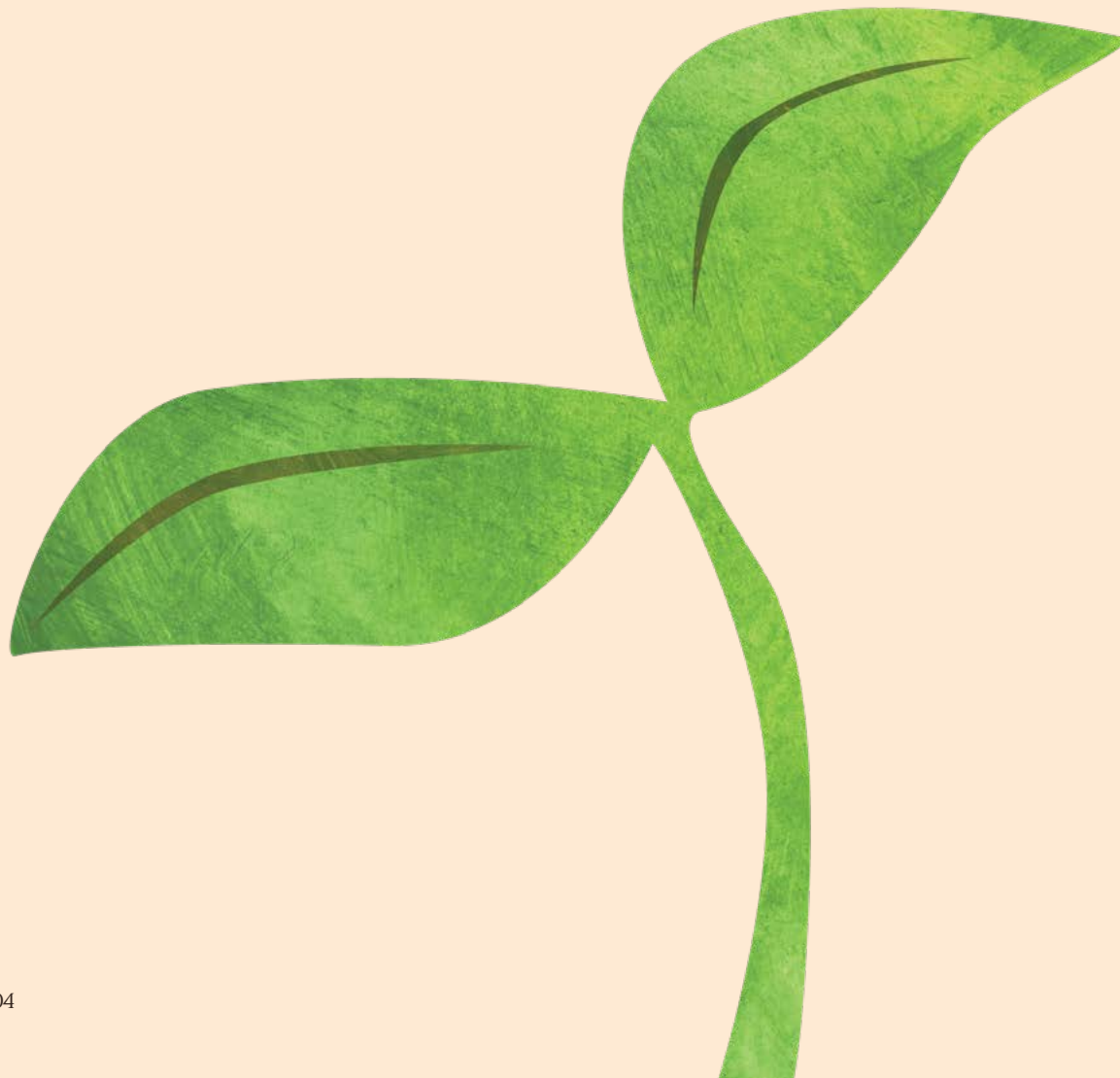
1. Implementing a consistent structure throughout the sessions (if working with the same group of students in multiple sessions) would be beneficial in managing student engagement and expectations more effectively. This could involve establishing a predictable routine or format for each session, which can help provide a sense of clarity for the students.
2. When working with a mixed-grade class, it is crucial to be mindful of varying reading levels among students by creating materials that are accessible to everyone. This could look like simplifying language or providing alternative versions of worksheets tailored to different developmental stages in order to promote an environment where every student feels supported and able to fully and confidently participate in the learning process.
3. Not every student will be enthusiastic about the topic and/or activity and that is okay. While we can encourage them to participate and follow the prompt, it is also important to find ways to pique their interest, such as by providing an alternate prompt or allowing them to integrate their own interests into the project.

Due to the constraints of time, I was unable to measure the long-term impact of these classes on their attitudes towards the natural world. Nevertheless, I am confident that these activities contributed to a better understanding of other creatures, our shared needs, and our interconnectedness, even if only in the short term. If I have more opportunities in the future, I would like to further explore pathways to cultivate empathy through collaborative learning activities and to empower students to build a communal narrative (Talgorn & Ullerup, 2023) and foster collective action through art education, aligning with the framework of ecopedagogy (Bertling, 2023). I firmly believe that entire generations can be transformed if young learners are afforded more opportunities to regularly hone these skills and actively engage with the environment and biodiversity within their communities.



CHAPTER 4:

First Leaf



Through this thesis, I explored the potential positive impacts of cultivating empathy for the natural world to foster ecoliteracy through art education with elementary-level students. Although this research only scratched the surface of what I wished to explore, it has been an enriching experience that will inform my work as both an artist and educator moving forward. I am grateful for the opportunities I had to work with the students and gained many valuable experiences and insights. As highlighted by the teachers in Bertling & Moore's study (2021), students are interested in engaging with topics related to ecology and environmental issues and are motivated to make a difference (as cited in Bertling, 2023), a sentiment which I observed firsthand in the classrooms that I taught as well. I found that even at a young age, the students had a high capacity to understand and think critically about these issues and offered unique, creative solutions through their art. The age-appropriate art activities provided opportunities for students to learn about the natural world and respond in a way that is personal and meaningful to them, which I believe can facilitate their feelings of connection with and empathy for nature as they continue to explore these topics as they grow. My hope is that through these activities, they can see that art is a powerful tool through which we can learn more about our relationship with the world around us and make a difference through shedding light on important issues or designing solutions that can come to life, as exemplified by Dr. Alexandra Ginsberg's *Pollinator Pathmaker* (2021 - ongoing).

Due to the limited scope of this thesis, there were many aspects that I did not have the opportunity to explore or emphasize in my teaching and research. One such aspect is the importance of engaging students with local environmental issues. Environmental issues are often introduced through examples that are far away and do not impact the students directly. While teaching about global environmental issues is important, it is equally, if not more important, to connect students with challenges that impact their own communities and offer opportunities for them to actively participate in addressing them. In community settings such as the Mini Makerz weekend sessions, families frequently participated in activities alongside their children. This observation underscored the value of intergenerational collaboration and the potential broader impact of these activities in engaging adults with environmental topics together with their children. For example, these collaborative art activities and engagement with these topics can potentially serve as a gateway to forming positive habits and participating in environmentally-friendly activities together as a family, such as outdoor exploration, gardening, composting, beach clean-ups, upcycling projects, and more.

There is also potential for facilitating collaborative experiences within a classroom, which can strengthen the collective identity of the class and empower them to work together to make a difference in their community, such as transforming their school environment (Inwood & Sharpe, 2008).

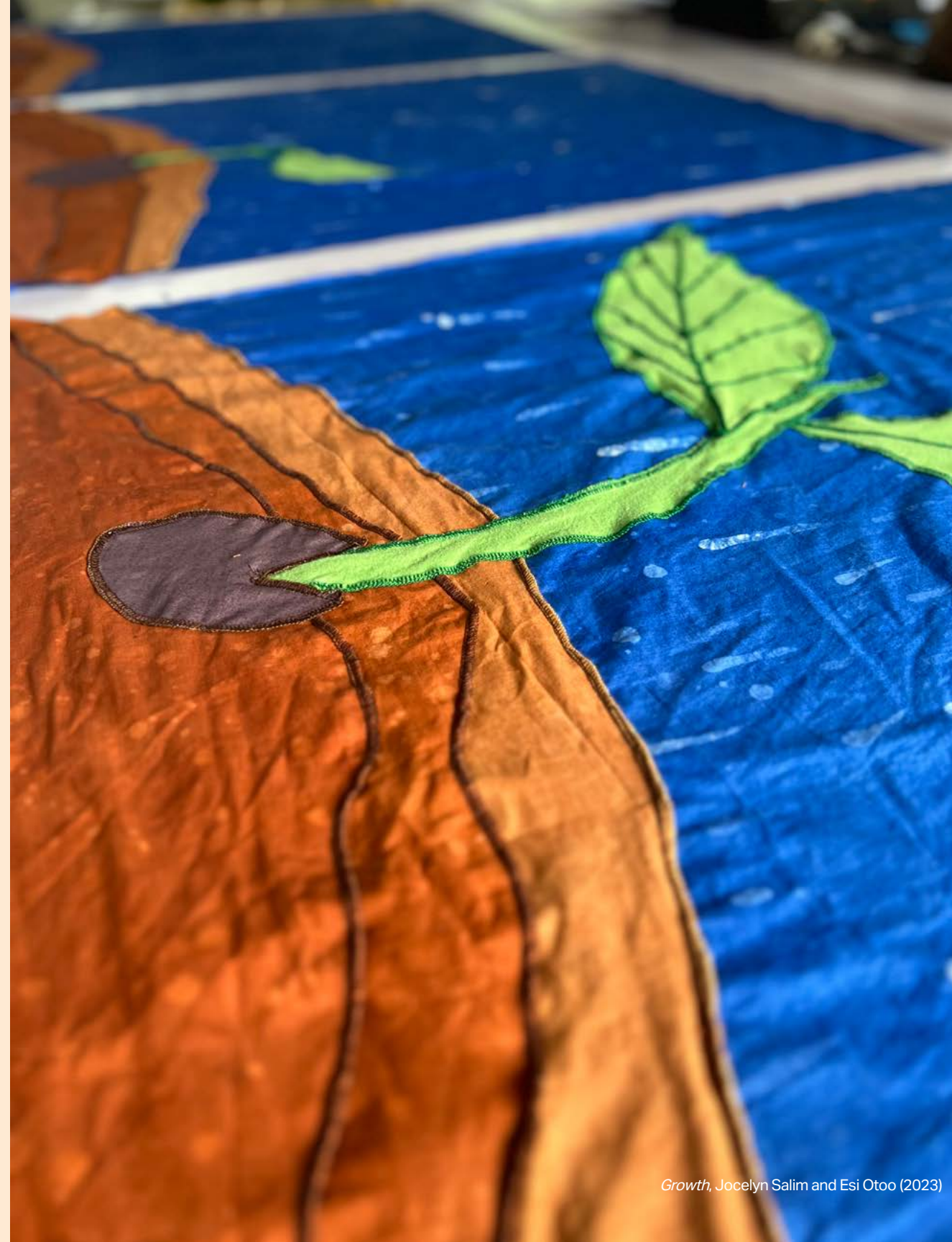
Another form of collaboration that I would like to explore is collaboration between teachers or experts from different fields. For the Mini Makerz sessions that I taught throughout the year, I took on the role of teaching both the science and art components of the lessons. However, in future iterations, I envision collaborating with educators or professionals specializing in various fields such as environmental science, biology, or sustainability. By doing so, we can create more comprehensive and enriching learning experience for students through exploring various modes of art education such as outdoor learning experiences or getting opportunities to investigate natural specimens in a microscopy lab in spaces such as the RISD Nature Lab. This collaboration has the potential to offer students a broader perspective and deeper understanding of the intersections between art and other disciplines. Particularly for older students, as subjects in schools often become more specialized, this interdisciplinary approach can provide valuable opportunities for interdisciplinary learning and exemplify the various ways in which art is connected to our daily lives.

Additionally, I did not have the chance to work with students in other age groups during the completion of this thesis. In the future, I aim to broaden my experiences by working with students of varying ages and backgrounds. Something that I did not get to explore was also the potential of working with technology, especially with older students. As mentioned in my conversation with Kay Vasey, engaging in digital games, immersive VR experiences, and digital art tools can offer innovative experiences to engage youths with ecology and environmental issues that foster empathy for the natural world by “making the invisible visible” (Goleman et al., 2012), or “making the unfamiliar familiar”

(Talgorn & Ullerup, 2023; Vasey et al., 2019; Thomas et al., 2018). I also hope to have opportunities to engage with students in a long-term setting, which would allow for me to facilitate opportunities for collaboration as mentioned earlier, and enable me to observe and assess the impacts of these environmentally-informed art activities on their attitudes and behaviors toward the natural world over time.

This thesis marks the beginning of my exploration into the intersection of art and environmental education, a journey I wish to continue in my practice as an artist and educator. Looking ahead, I aspire to develop a comprehensive resource guide that can be tailored to engage with and address the specific challenges of different communities and the biodiversity and ecosystems which they coexist through art education.* As a start, I have begun compiling a list of picture books that have the potential to enrich conversations and inspire creative activities around ecology and environmental issues which you can find in Appendix A. Furthermore, within my personal art practice, I also hope to tap on the power of storytelling and create picture books for children that inspire connections with and empathy for the natural world to promote ecoliteracy as they grow.

* Please refer to Appendix C, where I conducted a case study of Roots & Shoots, an organization that aims to empower youths to drive positive change their communities. Through this case study, I explored the history, vision, mission, and the diverse resources and opportunities provided by Roots & Shoots. While my aim is not to replicate something on the same scale, I aspire to develop valuable resources for people all over the world.



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APPENDIX A:

Children's Literature Resource Guide

Having stressed the significance of storytelling in nurturing empathy, I have initiated the creation of a resource guide featuring children's literature that can enrich conversations and inspire creative activities about ecology with young learners. Within this appendix, I have curated 13 examples of picture books, including those that I mentioned in my thesis. The books in this appendix are geared towards children around the age of 3 to 9, but the stories and lessons they offer hold universal value and can serve as a valuable resource to engage various age groups in discussions and activities. This list is a work in progress that I plan to continue to expand further and incorporate ideas for discussions and class activities.

Please visit bit.ly/EmpathyForNaturePictureBooks to access the updated resource guide.

01

We Are Water Protectors (2020)

by Carole Lindstrom, illustrated by Michaela Goade

ISBN: 9781250203557
Roaring Brook Press
(imprint of Macmillan Publishers)



Inspired by the many Indigenous-led movements across North America, *We Are Water Protectors* issues an urgent rallying cry to safeguard the Earth's water from harm and corruption—a bold and lyrical picture book written by Carole Lindstrom and vibrantly illustrated by Michaela Goade.

Water is the first medicine.

It affects and connects us all...

When a black snake threatens to destroy the Earth
And poison her people's water, one young water protector
Takes a stand to defend Earth's most sacred resource.

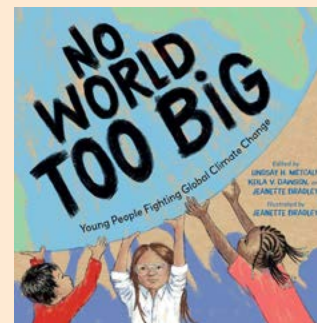
<https://carolelindstrom.com/books/we-are-water-protectors/>

02

No World Too Big: Young People Fighting Global Climate Change (2023)

by Lindsay H. Metcalf, Jeanette Bradley, and Keila V. Dawson, illustrated by Jeanette Bradley

ISBN: 9781623543136
Charlesbridge



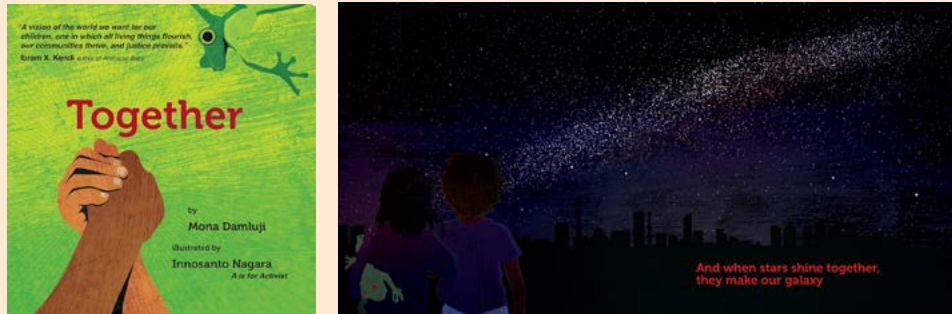
Climate change impacts everyone, but the future belongs to young people. *No World Too Big* celebrates twelve young activists and three activist groups on front lines of the climate crisis who have planted trees in Uganda, protected water in Canada, reduced school-bus climate footprint in Indonesia, invented alternate power sources in Ohio, and more. Fourteen poems by Vanessa Brantley-Newton, David Bowles, Rajani LaRocca, Renée LaTulippe, Heidi E. Y. Stemple, and others honor activists from all over the world and the United States. Additional text goes into detail about each activist's life and how readers can get involved.

<https://www.charlesbridge.com/products/no-world-too-big>

03

Together (2021)

by Mona Damluji, illustrated by Innosanto Nagara

ISBN: 9781644210840
Seven Stories Press

In *Together*, social justice kids book pioneer Innosanto Nagara teams up with poet and activist Mona Damluji for a stunningly tender and pitch-perfect visual feast that juxtaposes individual action with the power of people acting together. Each of the ten free-verse couplets in the poem is spread across four pages of imagery, to make a unique and different kind of board book for young kids to discover with their families.

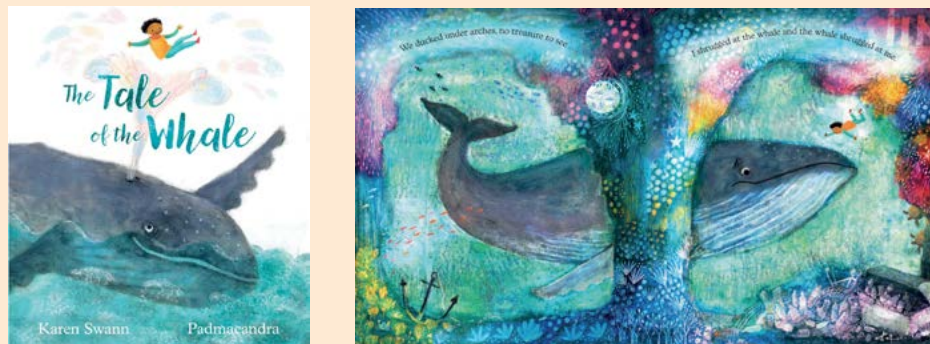
From a cacophony of birds and the movement of ocean waves, to the majesty of ancient mountaintops and the momentum of a movement for black lives, words and pictures work together to illuminate a sensory journey that inspires how we might come together to build a better future.

<https://www.monadamluji.com/work/booksforkids>

04

The Tale of the Whale (2022)

by Karen Swann, illustrated by Padmacandra

ISBN: 9781534493940
Margaret K. McElderry Books (imprint of Simon & Schuster)
[first published in Great Britain in 2021 by Scallywag Press]

Where land becomes sky and sky becomes sea, I first saw the whale and the whale first saw me.

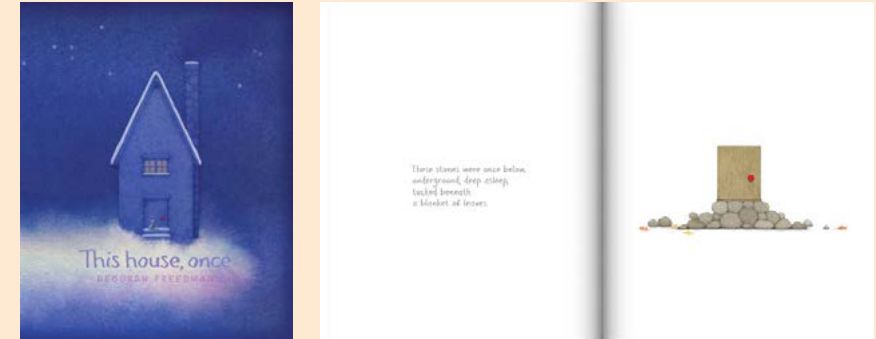
A child joins a friendly whale for a magical journey of discovery. They sail the blue ocean, dance with dolphins, and tail-splash seagulls. But the child also sees an ocean filled with plastic trash. And that inspires a promise of help, for the whale and all earth's creatures.

<https://www.simonandschuster.com/books/The-Tale-of-the-Whale/Karen-Swann/9781534493940>

05

This House, Once (2017)

by Deborah Freedman

ISBN: 9781481442848
Atheneum Books for Young Readers
(imprint of Simon & Schuster)

Deborah Freedman's masterful new picture book is at once an introduction to the pieces of a house, a cozy story to share and explore, and a dreamy meditation on the magic of our homes and our world.

*Before there was this house, there were stones, and mud, and a colossal oak tree—
three hugs around and as high as the blue.*

What was your home, once?

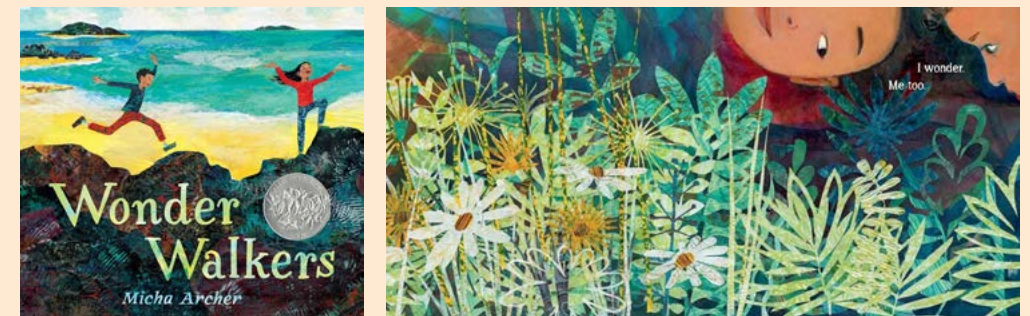
This poetically simple, thought-provoking, and gorgeously illustrated book invites readers to think about where things come from and what nature provides.

<https://www.simonandschuster.com/books/This-House-Once/Deborah-Freedman/9781481442848>

06

Wonder Walkers (2021)

by Micha Archer

ISBN: 9780593109649
Nancy Paulsen Books
(imprint of Penguin Random House)

When two curious kids embark on a "wonder walk," they let their imaginations soar as they look at the world in a whole new light. They have thought-provoking questions for everything they see: *Is the sun the world's light bulb? Is dirt the world's skin? Are rivers the earth's veins? Is the wind the world breathing? I wonder...* Young readers will wonder too, as they ponder these gorgeous pages and make all kinds of new connections. What a wonderful world indeed!

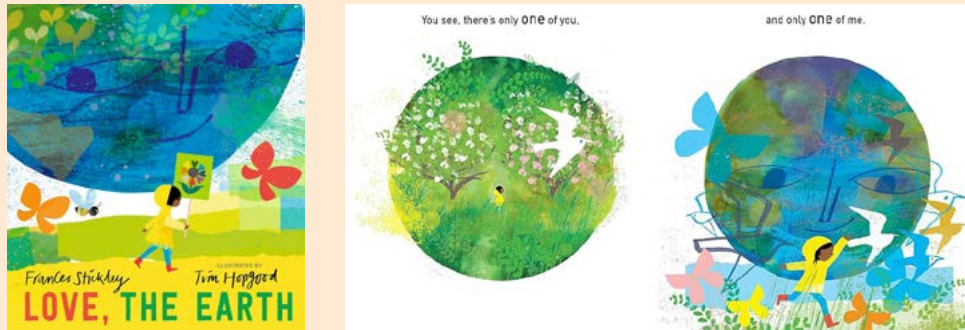
<https://www.penguinrandomhouse.com/books/623731/wonder-walkers-by-micha-archer/>

07

Love, the Earth (2024)

by Frances Stickley, illustrated by Tim Hoggood

ISBN: 9781536234121
Candlewick Press



*I am the Earth. All yours to share. The mountains and the Arctic air...
And now you're here, so small and new—a tiny little dream come true.
Don't worry. I'll take care of you. Will you take care of me?*

Told from the perspective of the Earth, this moving picture book—part love letter, part rallying cry—tours the epic and ordinary wonders of the natural world and entreats us to do our bit to help the planet in turn. Combining Frances Stickley's welcoming, rhyming text and spectacular artwork by best-selling illustrator Tim Hoggood, this enchanting celebration is essential reading to connect young minds with the beauty of nature.

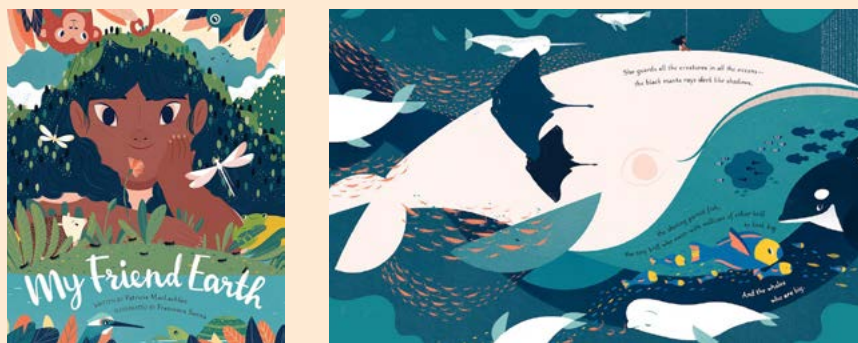
<https://www.candlewick.com/cat.asp?browse=Title&mode=book&isbn=1536234125&pix=y>

08

My Friend Earth (2020)

by Patricia MacLachlan, illustrated by Francesca Sanna

ISBN: 9780811879101
Chronicle Books



Our friend Earth does so many wonderful things! She tends to animals large and small. She pours down summer rain and autumn leaves. She sprinkles whisper-white snow and protects the tiny seeds waiting for spring.

Readers of all ages will pore over the pages of this children's book that is bursting with color and texture. Its enticing pages feature clever cut-outs, flaps, and curved contours that encourage exploration as its poetic text celebrates everything Earth does for us, all the while reminding us to be a good friend in return.

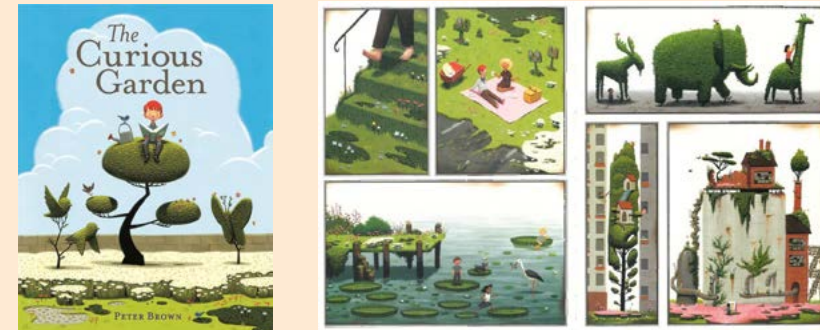
<https://www.chroniclebooks.com/products/my-friend-earth>

09

The Curious Garden (2009)

by Peter Brown

ISBN: 9780316254410
Little, Brown Books for Young Readers



One boy's quest for a greener world... one garden at a time.

While out exploring one day, a little boy named Liam discovers a struggling garden and decides to take care of it. As time passes, the garden spreads throughout the dark, gray city, transforming it into a lush, green world.

This is an enchanting tale with environmental themes and breathtaking illustrations that become more vibrant as the garden blooms. Red-headed Liam can also be spotted on every page, adding a clever seek-and-find element to this captivating picture book.

<https://www.peterbrownstudio.com/books/the-curious-garden/>

10

Outside In (2020)

by Deborah Underwood, illustrated by Cindy Derby

ISBN: 9781328866820
Clarion Books
(imprint of Harper Collins)



Outside is waiting, the most patient playmate of all. The most generous friend. The most miraculous inventor. This thought-provoking picture book poetically underscores our powerful and enduring connection with nature, not so easily obscured by lives spent indoors.

Rhythmic, powerful language shows us how our world is made and the many ways Outside comes in to help and heal us, and reminds us that we are all part of a much greater universe. Emotive illustrations evoke the beauty, simplicity, and wonder that await us all... outside.

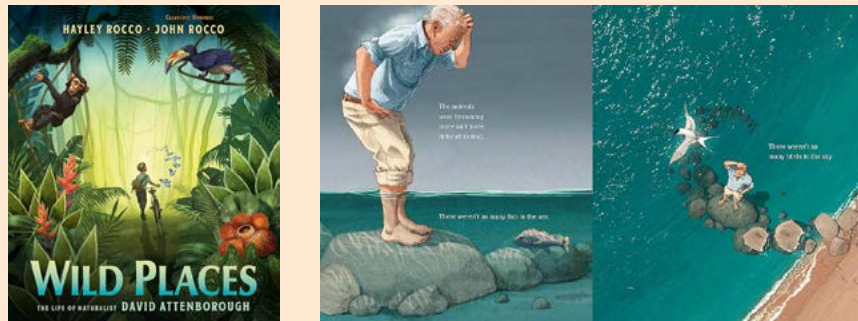
<https://www.harpercollins.com/products/outside-in-deborah-underwood>

11

Wild Places: The Life of Naturalist David Attenborough (2024)

by Hayley Rocco, illustrated by John Rocco

ISBN: 9780593618097
Penguin Random House



As a boy, David loved exploring the wild places near his home in England, collecting fossils, rocks, and newts. When he grew older, he got a job in television, where he had an idea for a new kind of show: He would travel to wild places all over the world to film animals in their natural habitats. Over the span of seven decades, David's innovative documentaries have been treasured by millions of people.

But as time went on, he noticed the wild places he loved were shrinking. What could David do to help? What could we all do?

This is the story of David Attenborough. It's also the story of our planet, which has changed rapidly over the course of one person's lifetime, and a clarion call for us to do our part to bring back the wild places and protect the creatures who call Earth home.

<https://www.penguinrandomhouse.com/books/718752/wild-places-by-hayley-rocco-illustrated-by-john-rocco/>

12

Jumper: A Day in the Life of a Backyard Jumping Spider (2023)

by Jessica Lanan

ISBN: 9781250810366
Roaring Brook Press
(imprint of Macmillan Publishers)



*What if you were small as a bean, could walk on the walls and ceiling,
Sense vibrations through your elbows, and jump five times your body length?
That is Jumper's world.*

Open this book to discover the vibrant, hidden life of a backyard jumping spider.

<https://us.macmillan.com/books/9781250810366/jumper>

13

Becoming a Good Creature (2020)

by Sy Montgomery, illustrated by Rebecca Green

ISBN: 9780358252108
Clarion Books
(imprint of Harper Collins)



School is not the only place to find a teacher. In this beautiful picture book, learn the many surprising lessons animals have to teach us about friendship, compassion, and how to be a better creature in the world.

Beloved, bestselling author Sy Montgomery, often described as part Emily Dickinson, part Indiana Jones, has had many teachers in her life: some with two legs, others with four, or even eight! Some have had fur, feathers, or hooves. But they've all had one thing in common: a lesson to share.

The animals Sy has met on her many world travels have taught her how to seek understanding in the most surprising ways, from being patient to finding forgiveness and respecting others. Gorillas, dogs, octopuses, tigers, and more all have shown Sy that there are no limits to the empathy and joy we can find in each other if only we take the time to connect.

Based on the New York Times bestselling adult memoir, Sy Montgomery and Rebecca Green's beautiful, friendly guide is for readers young and old who wish to be better creatures in the world. Go ahead, pass it on.

<https://www.harpercollins.com/products/becoming-a-good-creature-sy-montgomery>

Activity kit available on Sy Montgomery's website: www.symontgomery.com/becoming-a-good-creature/

APPENDIX B:

Mini Makerz Lesson Plans

Mini Makerz Weekend Program:

Session 1: Turning Trash into Treasure

Session 2: Message from

Mini Makerz & Creature Converse:

Week 1: The Amazing World of Pollinators

Week 2: Stories for Pollinators

Week 3: Designing a Garden with Empathy

Full lesson plans and resources available online at bit.ly/JS2024MiniMakerzResources

Mini Makerz Weekend Program Session 1: Turning Trash into Treasure

Brief Project Description:

- In this lesson, students will learn about how to repurpose material, thinking about its intended use and how we can use it in a new and innovative way. We will read a picture book, *“This House, Once”* written and illustrated by Deborah Freedman, which is about what materials different parts of a house used to be (e.g. the door used to be part of an oak tree, the glass windows used to be sand).
- The students will then work on their own projects, using plastic bottles as their main material, to create a functional art piece that will benefit the environment - a plant pot or bird feeder. They can work together with their adult or the teacher if they need assistance.

Timeline:

10:30 AM - 10:45 AM: Pre-class activity
10:45 AM - 11:00 AM: Introduction and reading
11:00 AM - 11:50 AM: Activity
11:50 AM - 12:00 PM: Closure

Big Ideas:

- In this lesson, students will learn about how to repurpose material, thinking about its intended use and how we can use it in a new and innovative way. We will read a picture book, *“This House, Once”* written and illustrated by Deborah Freedman, which is about what materials different parts of a house used to be (e.g. the door used to be part of an oak tree, the glass windows used to be sand).
- The students will then work on their own projects, using plastic bottles as their main material, to create a functional art piece that will benefit the environment - a plant pot or bird feeder. They can work together with their adult or the teacher if they need assistance.

Materials:

- Coloring pages (pre-class activity)
- Worksheet
- Take-home instruction sheets
- Plastic bottles (different shapes, sizes and colors; caps and rings can be separated)
- Soil
- Seeded paper
- Bird feed
- Scissors
- Glue, scotch tape, double-sided tape
- Drawing/coloring materials: Pencils, markers, colored pencils, crayons, etc.
- Acrylic paint and paint brushes
- Permanent markers / paint markers
- String / yarn / twine
- Wooden dowel rods (provide varying thickness and lengths, roughly around 1/4 - 1/2 inch thick and 6 inches long)
- Craft materials (pipe cleaner, googly eyes, beads, etc.)

Activity Details:

Pre-class activity

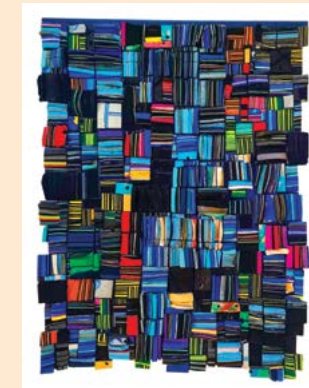
- Let students work on coloring pages or free drawing while people start to stream in

Hook & Intro

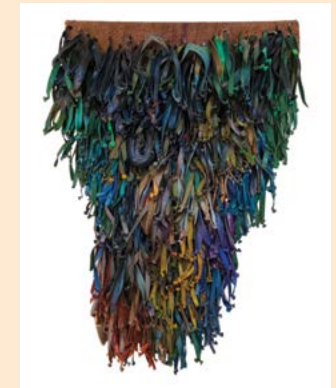
- Read "This House, Once"
- Introduce artist
 - Patrick Tagoe-Turkson is a Ghanaian mixed-media artist who upcycles plastics, such as old flip flops, and uses them as material for his work
- Discuss:
 - What do you see?
 - What do you think this is made of?
 - Why do you think the artist used that material?
 - What story is he trying to tell through his art?
- Observe Patrick's process [1 min video: 'Patrick Tagoe-Turkson's tapestries: from waste to art!']
 - What materials did he use for his work?
 - Where do you think he gets his materials from?
 - Why does he need to collect all those flip-flops?



Patrick Tagoe-Turkson
<https://ooagallery.com/artists/58-patrick-tagoe-turkson/biography/>



Ofre (2018), OOA Gallery
<https://ooagallery.com/artists/58-patrick-tagoe-turkson/works/9802-patrick-tagoe-turkson-ofre-2018/>



Galamsey Chocolate (2022), ARTCO Gallery
<https://www.artsy.net/artwork/patrick-tagoe-turkson-galamsey-chocolate>

Introduce project and discuss ideas

- Talk about uses of plastic and why single-use plastic may be harmful to the environment
- Discuss how we can reuse single-use materials in a way that gives back to the environment instead of throwing them away
- Introduce project and show examples of bird feeder and plant pot
- Talk about local bird species, what they need to survive, and how we can help them
- Example dialogue to spark discussion:
 - Today we are also going to make some art using something we use all the time and can find everywhere, can you guess what it is?
 - Do you think plastic is good or bad? Why?
 - Plastic itself can be good and useful for many different things, but single-use plastic is bad for the environment because they are usually thrown away after using only once, and they take a very long time to break down.
 - Instead of throwing it away, do you have any ideas of what we can use these bottles for?
 - So today, we will be transforming this plastic bottle into something new that is good for the environment!
 - Do you know what kind of birds we have in Rhode Island? (cardinals, blue jays, sparrows, etc.) Winter is coming, and it might be more difficult for birds to find food, so having bird feeders is a good way to help them get through the winter.
 - If you're not interested in making a bird feeder, you can also make a plant pot and grow some seeds in it!


Exploration & Making

- Students can choose between making a bird feeder or a plant pot
- Create a sketch of their design (10 minutes)
- Choose and prepare materials
- Pick a bottle
- Use scissors to cut an opening (bird feeder) or cut off the top half of the bottle (plant pot)
- Supervise and guide younger students
- Assemble artwork
- Decorate with paint and craft materials
- If students finish early, they can be prompted to start on another project.

Closure:


- Plant pots
- Poke holes on the bottom of the bottle and add soil
- Give student seeded paper and planting instructions
- Bird feeder
- Fill bird feeder with seeds
- (or pre-pack seeds in other upcycled bottles or bags to avoid mess)
- Photograph students' projects
- Clean up

Worksheet & take-home instruction sheets



Turning Trash into Treasure!

Plastic bottles are not great for the environment, but we can turn it into something new and use it to give back to nature. Let's upcycle together!
Sketch your ideas for a birdfeeder or plant pot in the box below.




Seed instructions:

1. Soak this heart overnight
2. tear it up and plant under a thin layer of soil in your new pot
3. Water gently and regularly until seedlings sprout into beautiful wildflowers!

Let's celebrate your new birdfeeder! Feeding can help our feathered friends survive the cold winter.

Here are some sunflower and safflower seeds to start you off. These seeds are popular among many birds. They are high in fat and can give them lots of energy to help them stay warm.



Scan the QR code for helpful tips about bird feeding in the winter in Rhode Island!

Mini Makerz Weekend Program

Session 2:

Message from the Ocean

Brief Project Description:

- In this lesson, students will learn about plastic pollution in the ocean and embark on a project making a message in a bottle from the perspective of another animal to a human. We will read a picture book, "The Tale of the Whale" by Karen Swann and Padmacandra, which depicts a whale taking the character on a journey through the ocean to see its beauty but also all the trash that sea creatures have to deal with.
- Students will then work on their projects to write or draw a message, thinking about what they would say to a human if they were a sea creature, which they will roll up and put in a bottle that they can decorate.

Big Ideas:

- Convey the message that we are animals too; if other animals are in trouble, we are also in trouble, so we need to do better to help them.
- Foster empathy towards non-human animals through perspective-taking.
- Repurposing materials that would otherwise be considered waste

Timeline:

- 10:30 AM - 10:45 AM: Pre-class activity
- 10:45 AM - 11:00 AM: Introduction and reading
- 11:00 AM - 11:50 AM: Activity
- 11:50 AM - 12:00 PM: Closure

Materials:

- Coloring pages (pre-class activity)
- Drawing paper or colored paper
- Plastic bottles with caps
- Drawing/coloring materials: Pencils, markers, colored pencils, crayons, etc.
- String / yarn / twine
- Scissors
- Glue, scotch tape, double-sided tape
- Craft materials (pipe cleaner, pom poms, beads, etc.)
- Ocean-themed stickers
- Sea creature stamps
- Gift tags

Activity Details:

Pre-class activity

- Let students work on coloring pages or free drawing while people start to stream in

Hook & Intro

- Ask students what they know about plastic pollution and how they think it affects animals
 - Do you know what is plastic pollution?
 - What do you think causes plastic pollution?
 - Who do you think is affected by plastic pollution?
 - Where did you learn that from?
- Read "The Tale of the Whale"
- Reflection
 - What other animals besides the whale did you see in the book? How were they impacted by plastic?
 - Mistaking it as food
 - Entanglement
 - Sea turtles, seagulls, seals, dolphins, etc.
 - How do you think the plastic end up in the ocean? Why?
 - What are some things we can do to help these animals?
 - Pick up trash on the beach
 - Avoid using single-use plastic
 - If these creatures can talk, what do you think they would say to humans?



Tan Zi Xi

<https://medium.com/@startindia/tan-zi-xis-plastic-ocean-cdb97c291007>



Plastic Ocean (2016)

<https://oceanic.global/tan-zi-xi/>

- Introduce artist
 - Tan Zi Xi is a Singaporean artist who created an artwork called *'Plastic Ocean'* – an immersive installation illustrating the perspective of a fish swimming through an ocean cluttered with plastic waste.
 - Walkthrough of 'Plastic Ocean': <https://vimeo.com/185041614>
 - Prior to making the installation, Zi Xi created a series of illustrations, 'An Effort Most Futile', highlighting the same issue.
 - Discuss:
 - What do you see?
 - How do you think all that trash ends up in the ocean?
 - How would you feel if you were a sea creature trying to swim through the trash?
- Introduce project and discuss ideas
 - Explain what a message in a bottle is and how we are going to make one but from the perspective of a sea creature
 - Discuss ideas of what students could say in their message
 - Example dialogue:
 - For our activity today, we are going to make a message in a bottle – do you know what that is? We are going to pretend like we are a sea creature and write a message to a human who is going to find our bottle on the beach. And when you're done, make sure you don't throw your bottle into the ocean – I think it's too special for that. You can then give it to someone special or give it to yourself.
 - On a piece of paper, I want you to write or draw a message from a sea creature to a human, and include one advice for the human on how they can help us, the sea creatures, with the problem of plastic pollution

Exploration & Making

- Prompt students to pick a bottle and a paper for their message
- Make sure the height of the paper will fit the bottle, otherwise, cut it until it will fit
- When students are done with their message, they can start filling their bottle with sand and decorating the bottle
- Remind students not to cover up the exterior of the bottle too much so that the sand and the rolled-up message will be visible at the end
- Once they are done decorating, roll the message and tie it with a string (make sure it fits the opening of the bottle),

Closure:

- Tie a tag on the bottle with a stamp of the animal that they are representing
- Mention to students that they can gift the bottle to someone and tell them about what they learned, or they can keep it for themselves as a reminder
- Photograph students' projects
- Clean up



An Effort Most Futile (2009)

<https://oceanic.global/tan-zi-xi/>

<https://messymsxi.sg/portfolio/an-effort-most-futile/>



Mini Makerz & Creature Conserve

Week 1:

The Amazing World of Pollinators

Brief Project Description:

- We will be learning about local pollinators in Rhode Island and threats to their population through a presentation, a short discussion, and a collage activity.

Timeline:

- 3:15 PM - 3:20 PM: Introductions
- 3:20 PM - 3:35 PM: Presentation
- 3:35 PM - 3:45 PM: Artist and project intro
- 3:45 PM - 4:35 PM: Collage activity
- 4:35 PM - 4:45 PM: Closure

Materials:

- Worksheet
- Paper (drawing paper, colored paper, patterned paper, etc.)
- Scissors
- Glue and tape
- Drawing and coloring materials (colored pencils, crayons, markers, etc.)
- Old magazines and printed pictures

Activity Details:

Hook & Intro

- Introductions and icebreakers
 - What is your favorite dessert?
- Presentation (slides available digitally)
 - The presentation will cover basic information about pollinators including what pollinators do, types of pollinators, what they need to survive, threats to their population, as well as an introduction to pollinators native to Rhode Island
 - During the presentation, we will pass out a worksheet for them to track their ideas and thoughts/things they found interesting during the presentation with words or images.
- Short discussion
 - Following the presentation, we will facilitate a discussion to gather student input, encouraging them to share which aspects of the presentation resonated with them and new insights they gained.
 - Here are some questions to ask:
 - What did you find the most interesting from the presentation?
 - Is there something new that you learned? Or did you already know something about pollinators before this?
 - What do you think we can do to help pollinators?
 - How did this make you feel?
- Introduce artist: Faith Williams Drysten
 - Faith is an artist who makes work about the biodiversity and vulnerability of pollinators and our connections to them.
 - Highlight the various ways she creates art about pollinators and the different aspects she explores in each work, such as their life cycle or the connections between pollinators, plants, and the food we enjoy.



Faith Williams Drysten
<https://creatureconserve.com/faith-williams-dyrsten>



Bountiful Lines (2023)
<https://www.faithwilliamsart.com/Bountiful-Lines---2023.php>



Intertwined (2022)



Life Cycle (2022)



At the Verge (2020)

<https://www.faihwilliamsart.com/>

Exploration & Making

- Collage
 - Organize materials on 5 tables. Each table will have images and scanned pages from books of common pollinators (alternatively, materials can be categorized accordingly and placed on one table)
 - Butterfly
 - Bee
 - Birds
 - Bats
 - Flower flies
 - Every student will choose a table and be asked to make a collage, thinking about the collage making as a way of gathering information (making a moodboard/vision board) about the pollinator at their table.
 - As they are making their collage, prompt them to think about what aspects about pollinators they want to highlight through your collage.
- Here are some questions they can explore in their work:
 - What is a pollinator? (highlighting the animal, life cycle, etc)
 - How does pollination happen?
 - Where do pollinators live?
 - What plants depend on pollinators?
 - Why are they important to other living things including you and me? How do they help us get our food?
 - How are pollinators connected to the larger ecosystem that we live in?

Closure:

- Closure
- Clean up work stations
- Ask for volunteers to share about their work
- Document and take photographs of their work
- Collect worksheets
- Introduce next week's project

Worksheet

Mini Makerz: The Amazing World of Pollinators! Name: _____

What is a pollinator? How do they help plants?

What are some types of pollinators?

Why are pollinators important to other animals, including humans?

Why are pollinators in trouble and how can we help them?

What important facts did you learned today?

Mini Makerz & Creature Conserve Week 2: Stories for Pollinators

Brief Project Description:

- We will be learning about how we can use storytelling to share about the importance and impact of pollinators.

Timeline:

- 3:15 PM - 3:25 PM: Introductions and class agreements
- 3:25 PM - 3:45 PM: Recap of last week and story planning
- 3:45 PM - 3:50 PM: Magic zine demo
- 3:50 PM - 4:30 PM: Story writing/drawing activity
- 4:30 PM - 4:45 PM: Closure

Materials:

- Worksheet
- White and colorful tabloid sized paper
- Scissors
- Drawing/coloring materials: Pencils, markers, colored pencils, crayons, etc.

Activity Details:

Hook & Intro

- Introductions and icebreakers
 - What is your favorite type of pollinator?
 - (for students who were absent the previous week) Do you know what a pollinator is?
- We will start with a short recap of the first week for the children who were absent in the previous week. We will return their worksheets from the first week and pass around a simple worksheet with important points so tthat they can refer them while creating their story.

- Example questions to spark discussion:
 - Who remembers what we talked about last week?
 - Why are pollinators in trouble?
 - What do pollinators need to survive?
 - How can we help pollinators?
 - What's one thing you'd like to know about this animal about its life?
 - What's your wish/question for that animal?
 - What are your worries for that animal?
- On the second page of the worksheet, students can find a story-planning page where they can plan out their story and design their characters. They will be prompted to create a story about something that they would want someone else to know about pollinators, but they are free to create any story related to the topic.
 - Example guiding questions:
 - What will your story be about?
 - Who is your character? (human/pollinator/flowers/objects?) What perspective do you want to tell your story from?
 - What does your character look like? What are their characteristics?
 - What is your character's motivation? (e.g. to help their family and friends, to help the plants, to provide food for other living things)
 - Are there any other characters in the story?
 - What is the setting of the story?

Exploration & Making

- Give a demo on how to make a magic zine when students have completed planning worksheet.
- Students can continue working on their story-planning worksheet, but remind them that there is limited time to work on their actual stories so it would be better if they could get started on their zines.
- If students finish their zines early, they can also open up the zine and draw a poster on the back side.

Closure:

- Closure
- Clean up work stations
- Ask for volunteers to share about their work
- Document and take photographs of their work
- Collect worksheets
- Introduce next week's project

Worksheet

Mini Makerz: The Amazing World of Pollinators!

Name: _____

Let's Recap! Pollinators are in trouble because...

1. Habitat loss

Pollinators need natural spaces with flowering plants to live and forage for food. With more man-made structures replacing these areas, it becomes increasingly difficult for them to find food and shelter.

2. Pesticides

Pesticides are used to kill pests and parasites that affect plants in farms and in gardens. However, they are very harmful to pollinators that depend on the plants for food. Eating from a flower that has been sprayed with pesticides can make pollinators sick and can even lead to death.

3. Non-native Species

Pollinators require specific plants to survive. Native plants are important sources of food and habitats for local pollinator species. However, non-native plants can outgrow native plants, causing a decrease in sources of food and shelter for pollinators.

4. Climate Change

Climate change causes an increase in global temperatures, which leads to unusual and extreme weather conditions. This impacts the biodiversity of all living things and disrupts all kinds of ecosystems. Pollinators are keystone species in almost every ecosystem on earth - without them, we are all in trouble!

What can we do to help pollinators?

If you could talk to a pollinator, what question would you ask it?

What is your wish for pollinators?

Story Planning Template

Title of your story: _____

SETTING: Where does your story take place?

CHARACTERS: Who is your story about?

Main character's name:

What are their motivations?

Do they have special skills or hobbies?

What are their personality traits?

Draw your main character here!

What happens in your story?

Problem/Conflict

Resolution

Mini Makerz & Creature Conserve

Week 3:

Designing a Garden with Empathy

Brief Project Description:

- We will relate the importance of a garden tended to with empathy by allowing the students to design their own gardens through creating a diorama.

Timeline:

- 3:15 PM - 3:20 PM: Introductions
- 3:20 PM - 3:35 PM: Presentation
- 3:35 PM - 3:45 PM: Introduce project and discuss ideas
- 3:45 PM - 4:30 PM: Diorama activity
- 4:30 PM - 4:45 PM: Closure

Materials:

- | | |
|---|--|
| <ul style="list-style-type: none"> · Worksheet · Cardboard boxes (shoe boxes, packaging, mailer boxes, etc.) · Scissors · Glue and tape · Drawing and coloring materials (colored pencils, crayons, markers, etc.) · Acrylic paint, paintbrushes · Paper (drawing paper, colored paper, patterned paper, etc.) | <ul style="list-style-type: none"> · Old magazines and printed pictures · Natural materials (rocks, sticks, leaves, etc.) · Pipecleaners · Fabric scraps · Colorful felt · String / yarn / twine · Felted bees · Faux butterflies and flowers · Craft pompoms |
|---|--|

Activity Details:

Hook & Intro

- Introductions and icebreakers
 - What is your favorite place in nature?
- We will start the session by reflecting on the activities that we have done thus far and reiterate important points.

- We will engage students in a short discussion about empathy.
 - Example questions to spark discussion:
 - Do you know what empathy is?
 - What does it mean to see something through someone else's perspective? Or what does it mean to put yourself in someone else's shoes?
 - How can we show empathy towards others?
 - What are some ways you show empathy to your family or friends?
 - How can we show empathy for other species, like bees, butterflies, birds, and other pollinators?
- Presentation (slides available digitally)
 - Introduce artist: Dr. Alexandra Daisy Ginsberg
 - Dr. Alexandra Daisy Ginsberg is an artist from the UK, who created an online AI tool called Pollinator Pathmaker (pollinator.art) that anyone can use to design a garden with empathy for pollinators – planting and arranging plants based on what pollinators need rather than what humans want to see.
 - She defined empathy in this case as designing a garden with plants that support as many pollinator species as possible specific to a region. The platform uses an algorithm to calculate the planting design and selects and arranges plants to suit the different preferences of local pollinators.
 - She has worked together with the Eden Project to create a Pollinator Pathmaker living artwork as part of the “Create a Buzz” program at Eden Project that seeks to communicate the story of the UK's native pollinators.
- We will introduce the activity and discuss ideas on how we can show empathy for pollinators.
- Students are given some time to write or draw their ideas of what they think a garden designed with empathy for pollinators might look like on the worksheet.



Dr. Alexandra Daisy Ginsberg

https://arterritory.com/en/visual_arts/topical_qa/25837-pollinator_pathmaker_the_largest_ever_climate_positive_artwork/



Pollinator Pathmaker (2021)

Digital Rendering of Eden Project Edition

<https://www.daisyginsberg.com/work/pollinator-pathmaker>

Exploration & Making

- Diorama activity
- Introduce materials
 - Students are instructed to pick a box to use as the foundation for their project and they are free to select and the materials provided on the table.
 - As students are working, prompt them to think about how they are designing their gardens to suit the needs of pollinators (air, water, food, shelter) rather than for the benefit of humans.

Closure:

- Closure
- Clean up work stations
- Ask for volunteers to share about their work
- Document and take photographs of their work
- Collect worksheets
- Thank students for their hard work!

Worksheet

Mini Makerz: The Amazing World of Pollinators! Name: _____

What does a garden planted with empathy for pollinators look like?
Write and/or draw in the space below.

APPENDIX C:

Roots & Shoots Case Study

In Chapter 3, I had the opportunity to write about the conversations I had with Kay Vasey and Dr. Lucy Spelman and their work with their respective organizations, **MeshMinds** and **Creature Conserve**.^{*} Additionally, I also mentioned the work of Kokrobitey Institute in the introduction and wrote a little bit about my experience there and how it impacted my growth as an artist and educator. To add to those and to supplement my research, I conducted a case study exploring the work of Roots & Shoots and the ways that they engage with art, sustainability, and community engagement.

^{*} Refer to Chapter 3, "In Conversation With:", starting from page 32.

Roots & Shoots (www.rootsandshoots.org) is a student-driven, experiential service-learning global youth program of the Jane Goodall Institute, a non-profit organization founded by famous wildlife conservationist Dr. Jane Goodall. This is a program for children and youths all over the world who are interested in engaging with environmental and social issues within their communities and on a larger, global scale. It works on a hybrid model, with many resources accessible online on their website while encouraging in-person engagement. Roots & Shoots provides resources and tools to encourage and motivate young people to become empowered change-makers in their communities.

Roots & Shoots began in 1991, when 12 Tanzanian high school students from 8 different schools approached Dr. Goodall to discuss various problems they had witnessed in their community and what they could do about it. Some were interested in doing something about the illegal dynamite fishing which was destroying coral reefs, some were interested in why the government was allowing the building of dams and destruction of forests, and some were interested in doing something for the homeless children who needed food and shelter. They then gathered more of their friends who were interested in being involved, which resulted in the first Roots & Shoots meeting with 30 youths. Each group of students were allowed to choose what project they wanted to do within a theme or a mix of themes – to help people, animals, or the environment (Goodall, 2021).

The name Roots & Shoots symbolizes the power that something which seems as small and insignificant as roots and shoots from a seed can hold. As Dr. Goodall explains, "The young roots of a plant can work through rocks to reach water, and the shoots can work through cracks in a brick wall to reach sunlight ... The rocks and walls represent the problems we humans have inflicted on the planet" (Goodall, 2021). Roots & Shoots presents a message of hope for young people to know that they can truly make a difference when they work to make the world a better place. The organization is founded on the belief that "every single individual matters, makes a difference, and has a choice as to what kind of difference they make" (Goodall, 2021).

Dr. Goodall sees the potential in working with children and youths because she believes they have a role to play in the conservation movement. The core philosophy of Roots & Shoots is encapsulated in the phrase, "youth aren't just the future, they're the present" which is prominently featured on their website's program model page. Roots & Shoots is created for children as young as preschool to university students and beyond. There have also been active involvement of adult groups in diverse settings such as prisons, senior citizen centers, and corporate environments.

The mission of Roots & Shoots is to support the next generation in understanding and using the power and influence of their voices and actions to create positive change in the world starting from their local communities. In an interview following her lecture in Bozeman, Montana, Jane Goodall shares a message to the youth:

Sometimes, you might think that to make a real difference to help save nature and save animals, you have to get a degree or travel to a far-off place ... but you don't. You can actually make a really big difference in the places around you. In the little stream that you know, in your backyard, by learning about the creatures around you, [and] by sharing what you know with your friends. (Goodall, 2010)

The organization is dedicated to empowering young individuals to become a compassionate citizen and/or leader and take action within their communities. Their focus is to bring passionate youths together to contribute to helping people, animals, and the environment while learning to live in peace and harmony with one another and with the natural world, and promoting respect for all living things. Roots & Shoots outlines nine compassionate traits that they encourage young individuals to embody and develop as part of their mission. To facilitate this, their website offers resources and activities to help youths assess the traits they already have and how to strengthen them.



Roots & Shoots compassionate leadership skills and traits

Roots & Shoots primarily focuses on enhancing the accessibility of community engagement for young people by providing a guide and platform for them to participate in or create projects for their community through their four-step formula: get engaged, observe, take action, and celebrate. For each step, there is a digital toolkit that individuals or groups can use to guide them along the whole process.

1. **Get Engaged:** Understand issues within your community and find inspiration from other Roots & Shoots projects
2. **Observe:** Map out community assets and determine areas of need for people, animals, and the environment
3. **Take Action:** Plan ideas for possible projects, gather people and do the project
4. **Celebrate:** Share what you've accomplished to inspire others

Roots & Shoots has chapters, basecamps, members, and project groups in around 100 countries all over the world. Anyone can join or start a Roots & Shoots project in their community, and they can also apply for a grant to fund their project.



Map of active project groups all over the world

Lesson plans and at-home-learning resources are also available on the Roots & Shoots website. They have what they call “Project-in-a-Box”, which are essentially ready-made guides that follow the four-step formula for those who want to get involved but are unsure of how to plan and complete their own project. There are also resources for adults and/or educators such as online courses for professional development, networking opportunities, and a family toolkit, which encourages intergenerational learning and engagement.

Roots & Shoots is more focused on educating young people on community engagement rather than visual art education, but their curriculum and guide often include artistic or creative activities such as drawing tutorials, coloring templates, sketching, field journaling, and guides for special art projects to get young learners involved in events like Peace Day.

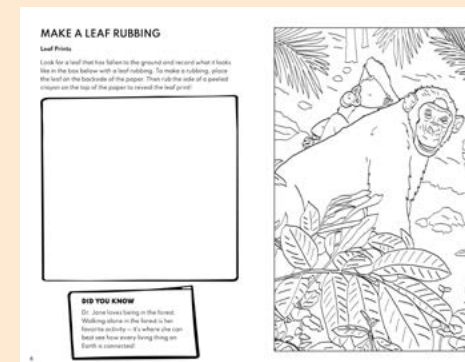
Sample service-learning lesson plans for elementary, middle, and high school curriculums which are adaptable to specific communities are available as resources on the Roots & Shoots website. Each lesson plan includes clear objectives, alignment with common core state standards, explanation of foundational vocabulary terms, essential questions, community partnership suggestions, and activities, with built-in flexibility for accommodations and modifications. An example of an elementary lesson plan which focuses on an animal community involves educating students about local animal shelters and their needs and facilitating a project where each student authors and illustrates a book depicting the life of an animal in a shelter. The plan encourages collaboration with a community partner, such as a local humane or no-kill animal shelter. The class can visit the shelter or invite a representative to speak to the students at the beginning of the project. As an extension, the activity may also include coordinating fundraisers or donation drives for the shelter and presenting the gifts to them at the project's conclusion.

A story of a Roots & Shoots member that I was particularly interested about talks about their experience of exploring environmental education through art. They teamed up with their friends in their local Roots & Shoots group in Cambridge, Massachusetts, and collaborated with a local quiltmaker, Clara Wainwright to create a quilt that depicted their vision of a sustainable city. The quilt includes self portraits of its creators and their environmental heroes, with the phrase “a city thrives when its people replenish what they use” (Eliza K., n.d.). They donated the quilt to the city to ensure that it is accessible and reaches a wide audience. In their reflection they wrote:

It is awesome that our quilt reached such a wide audience, and even cooler to think about the impact it potentially created. Often, people don't want to study the environment because they think that learning will be filled with boring, monotonous jargon... using art to educate makes the environment more accessible to all people—especially kids—rather than over-intellectualizing the subject. (Eliza K., n.d.)

This story is one of many examples of how youths all over the world have engaged with communities they formed through Roots & Shoots to make a positive impact in their community.

Although Roots & Shoots does not follow a conventional educational curriculum and it also doesn't emphasize art education, they do a great job at educating and engaging youths to get involved in conservation initiatives within their communities. The way that they are able to reach a wide range of audience with such a simple message and how they can break down their mission into actionable steps is very impressive and inspiring. Rather than prescribing specific project types, Roots & Shoots empowers individuals and groups to generate ideas for projects aligned with their passions and the unique needs of their communities.



A page from the *Naturally Curious Jane Journal*

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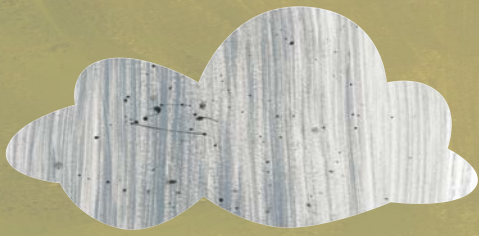


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