

ABSTRACT

Sowing the Seeds and REAPing the Benefits:
A Study of Mission Waco's Urban REAP and the Promise of Garden-Based Education

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Since its inception three years ago, Urban Renewable Energy & Agriculture Project (Urban REAP) sits on the cusp between the community's difficult past that is marked by poverty, food insecurity, and struggling schools, and its budding rejuvenation. With its desire to connect with local schools, Urban REAP has a unique opportunity to respond to the community's needs by empowering students and, in turn, their families to positively impact their community. Specifically, garden-based education at Urban REAP can provide fresh produce, promote healthy behaviors, and inspire care for creation in the students and families it serves. This thesis explores 1) The history and efficacy of garden-based education, 2) Creation care as an outcome of garden education and as integral to the Christian life, 3) Intellectual virtues as a form of creation care and a pedagogy that can excite disengaged students, and 4) The logistics in implementing garden-based education and ideas of curricula that embody creation care, intellectual virtues, and state standards.

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SOWING THE SEEDS AND REAPING THE BENEFITS:
A STUDY OF MISSION WACO'S URBAN REAP AND THE PROMISE OF
GARDEN-BASED EDUCATION

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PREFACE

Urban REAP and Mission Waco

Since 1991, Mission Waco has served the surrounding community by empowering the poor and marginalized, mobilizing the middle class, and addressing systemic issues that disempower the poor. One of their most recent endeavors, Jubilee Food Market and Urban REAP, seek to address the food desert challenge by providing healthy and fresh food choices for the community. Yet, keeping with their holistic mission, Urban REAP does not exist solely to provide food but also to provide transformational change. Urban REAP collects and distributes compost to the neighborhood, grows food in a sustainable aquaponics greenhouse, among other activities, to live out the cultural mandate from Genesis 1:28 given to all humanity to be stewards of the earth. True to Mission Waco fashion, Urban REAP invites community members to join in their goal to engage in environmental stewardship and transform their community. One of their modes of outreach is connecting with local schools. Urban REAP has already hosted multiple school field-trips and volunteer programs but has the potential and desire to expand their connections and programming.

And cue, this thesis. Inspired largely by Urban REAP's goal to connect with local schools, this thesis explores garden-based education as a platform for not only academic achievement but also for promoting environmental stewardship and personal growth in the form of intellectual virtues. Specifically, we will examine the foundations of Christian creation care and its implications for how we view our God, our world, and ourselves. As

a bridge between creation and curriculum, we will discuss intellectual virtues as a form of creation care that infuses deep meaning into education. Finally, we will look at garden-based education: Its benefits, obstacles, and promise for a community garden such as Urban REAP. Garden-based education offers a platform for students to discover their role as responsible stewards of creation and engage in hands-on learning that challenges them to think virtuously. In this way, garden-based education holds an intersection of Mission Waco and Urban REAP's goals. Virtuous thinking empowers people to flourish. Learning in and about creation mobilizes people to take action against the systemic issues facing society as a result of poor environmental stewardship.

As a helpful picture in explaining these ideas, we will use the following diagram. The trunk (garden-based education) and some of its benefits (the many branches) will be discussed in Chapter One. We will zoom in on one particular branch (creation care) in Chapter 2 and an offshoot of this branch, intellectual virtues, in Chapter 3. Finally, we will look at the roots necessary to anchor garden education in any school or community.



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I could write another 100 pages of thanks to the people who helped me along this journey. Thankfully, for you and for me, this abridged version will have to do:

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Thank you to Mission Waco for being a formative part of my time at Baylor. I learned so much about service, empowerment, and community building from your example and hope to continue growing in these values after college. I learned a lot from Baylor but I think I learned just as much from Waco- thankfully, Waco doesn't charge tuition!

To my family, thank you for everything. Thank you for the endless encouragement, bad puns, coffee, and lots of prayer as I finished writing my thesis. I thought I would be home for six days but it ended up being much, much longer. Thank you for making it a wonderful yet unexpected end of college.

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For all the friendships I have formed and experiences I never want to forget,
praise God from whom all blessings flow.

The earth is the Lord's, and everything in it,
the world, and all who live in it

Psalm 24:1

CHAPTER ONE

Sowing and REAPing in Garden-Based Education

Introduction to Garden Based-Education

In this chapter, we will explore garden-based education history, prevalence, and impact on students as we focus on the stem of our outline. Just as Mission Waco has a multifaceted goal of empowering and mobilizing its community, garden-based education has a Russian nesting doll effect that ultimately supports human flourishing. Garden-based education has the potential to address food insecurity and physical inactivity while promoting higher needs such as community belonging, self-esteem, and self-efficacy. With thoughtful planning, these effects can happen in tandem with academic achievement.

By caring for the body, mind, and spirit, garden-based education can lead to student flourishing that can have a ripple effect on the community. Though these are lofty goals, research supports these claims and points to the untapped potential of garden-based education. Further, as the philosopher Edmund Burke said, "Nobody made a greater mistake than he who did nothing because he could do only a little." We should not shy away from a far-reaching goal but, rather, work on incremental steps striving for the unreachable so that we may reach higher than before. Garden-based education offers an opportunity for educators to invest in the whole student for mind, soul, and body forming education.

In a culture marked by unhealthy lifestyles, environmental crises, and academic disengagement, garden-based education seems an especially apt path. Mission Waco is poised to provide the infrastructure, supports, and community connections to provide garden-based education for schools with limited or no internal garden-based educators or partnerships with master gardeners.

In this section, we will discuss the history of school gardens in the United States. Next, we will take a wide scope of the many potential benefits of garden education. We will then connect these outcomes back to Mission Waco and Urban REAP's goals.

History of School Gardens

School gardens started growing in popularity in the early 20th century and served a multifaceted purpose of increasing students' connection with the environment, improving education, and learning civic virtues associated with food production.

Beginning in the mid 19th century, the Nature-Study Movement sought to incorporate nature in the classroom to promote a love of the earth, to improve teaching, and to increase hands-on learning (Trelstad 162). Liberty Hyde Bailey, a leading figure in the Nature-Study Movement, wrote *The Holy Earth* and explained the purpose of the Nature-Study Movement "is to cause the child to love nature and thereby be content with country life," (Rodgers 237). Bailey believed in a spiritual connection between child and earth and sought to cultivate that relationship through Nature-Study (Trelstad 163). Though not emphasizing spirituality, American educator John Dewey similarly valued the interconnectedness students gained from garden-based education. Dewey focused on gardening's ability to guide students' natural interests into an appreciation for and

scientific curiosity about the environment (Ralston 7). Initially, school gardens presented pedagogical opportunities to marry nature with academics and spur students' interest in both.

As society became increasingly urbanized, more students grew distanced from the natural world and detached from the farm-to-table process of food production. This provided further impetus to begin school gardens in urban areas. An early proponent of school gardens and founder of the Children's School Farm in DeWitt, NY, Fannie Griscom Parsons wrote in 1902:

"I did not start a garden simply to grow a few vegetables and flowers. The garden was used as a means to show how willing and anxious children are to work, and to teach them in their work some necessary civic virtues; private care of public property, economy, honesty, application, concentration, self-government, civic pride, justice, the dignity of labor, and the love of nature by opening to their minds the little we know of her mysteries, more wonderful than any fairy tale" ("School Gardens").

Parsons' quote illustrates a shift from the "holy earth" and "spiritual connection" Bailey promoted in his gardens to using garden education to promote a variety of social goods (Trelstad 172). Parsons and her contemporary Progressive reformers viewed gardening as a means to beautifying the city, decreasing juvenile delinquency, improving health, and creating good workers and citizens (Trelstad 164-65). Similar to the Progressive reformers' push for standardized education, their gardens came to focus on the "control of children and their moral development," (Trelstad 165-66). The gardens of the Progressive movement became grounded in the practical, producing "little machines in their gardens." (Trelstad 165).

A few years later during the World Wars, gardens took another step towards pragmatism. Infusing the civic virtues Parsons espoused with excited patriotism, students

started growing crops to send to soldiers serving in the field (Wolsey and Lapp 3). The United States Bureau of Education began “The United States School Garden Army” and employed students as “soldiers of the soil,” armed with shovels and seeds (Hayden-Smith 1). There was an explosion of interest in school gardens, evidenced by the \$50,000 grant from the National Security and Defense that President Wilson later increased to \$250,000 (Trelstad 169).

World War I ended in 1918 and the fervor for school gardens soon followed. Though school gardens experienced a resurgence during World War II as “Liberty Gardens” with similar purposes as their WWI predecessors, the school garden effort once again faltered after the war (Wolsey and Lapp 54). Recounting the path of school gardens in America, Trelstad writes, “The values that guided the school gardens during World War I were so far from what Liberty Hyde Bailey had originally imagined that they must have been unrecognizable to him,” (172). In contrast to Bailey’s spiritual connection with nature, the Liberty Gardens had a primary focus on production and, when the need for production faltered, so did the purpose of these gardens.

In recent years, gardens have begun to take root once again in schools across the U.S. Rather than a world war, however, our nation faces an obesity epidemic. Based on 2019 statistics from the Center for Disease Control, 13.7 million (18.5%) children and adolescents are obese (“Childhood Obesity”). With a disturbing increase in obesity accompanied by a rise in type II diabetes among children and adolescents, educators and policy-makers look to school gardens as a path towards healthier lifestyle choices. If students create personal connections with the farm-to-table process, school garden proponents believe, students will be more willing to try new foods and incorporate fresh

fruits and vegetables into their regular diets (Lineberger and Zajicek 594-95; Pothukuchi 133).

In addition to promoting healthy behaviors and civics, school gardens give educators a platform to address environmental care. As another trending topic in our society today, environmental care has taken root as further support of expanding garden-based education. School gardens allow students who spend significantly more time indoors and connected to a screen time to unplug from the matrix and experience the fresh air that gardens bring. In his influential book *Last Child in the Woods*, Louv writes, “Nature Deficit Disorder describes the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses,” (Louv 36). Alternatively, children can be “biologically, cognitively, and spiritually” blessed with an abundance of nature (Louv 36). By playing, learning, and working in gardens, students will grow a greater appreciation for the natural world and this, in turn, will promote better stewardship of the environment.

Beyond teaching healthy behaviors, civics, and environmental care, school gardens offer exciting ways for educators to incorporate hands-on, engaging lessons. The garden offers a myriad of options for teachers. Educators can use compost recipes as a way to teach math operations; garden observations and admirations as inspiration for poetry and other literary devices; and various experiments testing the best growing environments to hone in on the scientific method and other scientific concepts. Obscure lessons that evoke responses of “But when will I ever *use* this?” can find their place in the garden, perhaps under the context of a long-term project that is replete with meaning and relevance for the students.

As an underlying force in the three aforementioned issues, we have a shocking disparity between racial and ethnic groups and varying socioeconomic classes. Regarding health, non-white and low-income populations experience worse levels of health and worse access to care than their white and wealthy counterparts (Baum and Fisher; Ozer 859; Ray et al. 380). Connected to this, neighborhoods of predominantly Black and Hispanic people are more likely to experience pollution, toxic waste dumps, and other negative environmental effects (Collins et al. 8). Finally, there is an “achievement gap” between groups, with Black and Hispanic students trailing behind their white counterparts (“Students Affected”). While this “achievement gap” suggests an issue with the individual student’s achievement, the gap is an outcome of the many factors hindering Black and Hispanic students from their academic opportunities that cultivate their potential (Ray et al. 380). As Dr. Rashawn Ray writes, “How are children supposed to focus on a standardized test when their bronchial tubes are filled with pollution, the food located near their homes is unhealthy, and the commute to and from school is tumultuous due to gang activity and/or over policing?” (Ray et al. 382). The issues of health, environmental care, and student engagement affect students of every color, class, and creed but disproportionately affect students from minority and economically disadvantaged backgrounds.

With this backdrop, we see the intense potential of garden-based education as the intersection of health, stewardship, and meaningful education, especially in underserved communities. California Superintendent of Public Instruction, Delaine Eastin, recognized similar disparities in California and called for a garden in every school in 1995 (Eastin). She initiated the creation of more than 3,000 gardens in California schools and, today,

there are several more thousand across the nation. In the early 2000s, the No Child Left Inside (NCLI) coalition began in response to the No Child Left Behind Act, legislation that was seen as narrowing the curriculum and putting too much weight on standardized tests (Williams 212). This focus, NCLI proponents hold, made teachers allocate time and resources to test material primarily focused on math and reading with little time left for other subjects, such as environmental studies. In this vein, former First Lady Michelle Obama's campaign "Let's Move!" in 2010 illustrates the continued push for increased child activity and outdoor engagement ("Learn the Facts"). The conversations, movements, and legislations happening around education are calling for a multifaceted solution to a complex issue. School gardens, with their growing evidence-based efficacy and increasing support, are one promising solution.

A sub-set of garden-based education, aquaponics is an equally promising solution to its traditional garden counterpart. Though a new field with limited research, school aquaponics systems have shown many positive results such as improved eco-conscious behaviors, engaged learning, and increased parent involvement (Schneller et al. 261-262). Further, research demonstrates aquaponics as a viable interdisciplinary learning tool for K-12 grades and college students (Genello et al. 17). With its already thriving aquaponics system and garden, Urban REAP is uniquely situated to expand both of these endeavors as they connect with local schools to address the health, academic, and community goals mentioned above.

In the following sections, we will explore four outcomes of garden-based education: academic achievement, a healthy lifestyle, environmental stewardship, and community and social development ("Curriculum Overview" 7-12). Afterward, we will

look at Waco's characteristics that make it a fertile ground for garden-based education. We will connect the goals of garden-based education with Urban REAP's mission and how Urban REAP can respond to some of the needs facing its community, particularly its neighborhood elementary schools striving to meet academic standards.

Measured Outcomes of Garden-Based Education

Though garden-based education is not a new phenomenon, the research documenting the effects of garden-based education has not been comprehensive. Most of the studies focus on elementary grades with few covering high-school students. Further, factors such as the garden curriculum used, amount of time spent in the garden, and teacher enthusiasm for garden-based education may vary greatly. These uncontrolled variables can make systematic reviews and drawing firm conclusions difficult. Still, with the research available, many studies demonstrate promising results.

The following table summarizes the research articles discussed below, including a review of the literature by Williams and Dixon as well as Ozer.

<i>OUTCOME AREA/ STUDY</i>	<i>OUTCOME VARIABLE</i>	<i>POSITIVE / NEGATIVE FINDINGS</i>
<i>Academic achievement/ Klemmer et al.</i>	<i>Science achievement. 3rd-5th grade</i>	<i>Positive</i>
<i>Academic outcomes/ McCarty</i>	<i>Standardized science test scores, academic engagement, Multiple grades</i>	<i>Positive</i>
<i>Academic achievement/ Smith and Motsenbocker</i>	<i>Science achievement. 5th grade</i>	<i>Mixed; One out of four science chapters had significant improvement</i>
<i>Academic achievement/ Williams and Dixon</i>	<i>Science, language arts, math achievement. Multiple grades</i>	<i>Mixed. Science: 93% positive effect Lang. arts: 72% positive effects Math: 80% positive effects</i>
<i>Health outcomes/ Ozer</i>	<i>Willingness to try and preference towards vegetables; physical activity levels. Multiple grades</i>	<i>Positive</i>
<i>Personal outcomes/ LifeLab</i>	<i>Students' enthusiasm for learning, emotional well-being, connection with school</i>	<i>Positive</i>
<i>Personal outcomes/ Williams and Dixon</i>	<i>Motivation, curiosity and wonder, life skills, academic attitudes, discipline. Multiple grades</i>	<i>Positive</i>
<i>Environmental attitudes/ Ozer</i>	<i>Environmental sustainability and care. Multiple grades.</i>	<i>Positive</i>

Health

Until the opening of Jubilee Market in the fall of 2016, the surrounding area in Waco was in a food desert. Without easy access to healthy and fresh food options, people in food deserts must often opt for highly processed food from local convenience stores. Because of this, food deserts are associated with higher rates of obesity and diabetes (Wolsey 55). Further, Ozer's systematic review found that inadequate vegetable consumption has been correlated to lower academic performance, alcohol and drug use, being overweight, and weight dissatisfaction (Ozer 853). Local school and community gardens have great potential to combat the issues associated with food deserts by 1) providing fresh produce, 2) helping students food understand the food system particularly food production, and 3) making students excited about eating fresh produce.

In addition to making healthy foods more available, school gardens can influence the norms around healthy eating. In the best-case scenario, school gardening has the potential to provide positive social influence from school peers and family members that promotes eating vegetables as a normative practice (Ozer 853). Additionally, since many teachers use school gardens to teach nutrition, students can have a better understanding of the benefits of fresh foods and the risks of less nutritious choices. By not only providing fresh produce but also transforming students' perceptions of healthy eating, school gardens are promising options in improving the health crisis plaguing many communities today.

Empirical evidence further supports the anecdotes of the health benefits from school and community gardening. Dr. Emily Ozer's systematic review of school gardens demonstrated promising results of students' interest in healthy eating due to increased

garden exposure (Ozer 850). Four of the outcomes Ozer found with statistically significant increases include:

1. Knowledge and preference to some vegetables
2. Willingness to taste vegetables
3. Positive attitudes toward eating fruits and vegetables
4. Youth's consumption of fruits/vegetables and physical activity

Other research points to the gardens' abilities to re-personalize food for students who are likely far removed from how food goes from farm to table. Thorp and Townsend write:

“When one gardens, food can no longer be viewed as a mere commodity for consumption; we are brought into the ritual of communal goodness that is found at the intersection of people and plants. Food that we grow with our own hands becomes a portal for personal transformation,” (Thorp and Townsend, 357).

When children spend time gardening, they take ownership of their work and become excited to taste the produce they have grown. "Eating your vegetables" is no longer a chore but an exciting and well-deserved reward after many hours spent working in the garden. Though not every child will go home preferring kale chips to chicken nuggets, they will at least go home with the exposure to healthy foods and stories to share with their parents. School gardens present a great opportunity for schools to connect with their communities and positively influence the health of the students and families they serve.

One example of school gardens' community-wide impact is the Bell Gardens project in a food desert in California. Aware of the needs their community faced, students and parents created door-step gardens, large pots filled with soil and seeds placed on the doorstep of surrounding houses. Rather than making a long journey to the nearest grocery

store, families now have fresh produce at their door (Wolsey and Lapp 55). Additionally, to combat the high incidence of obesity and diabetes in their community, students at Bell Gardens decided to create cookbooks and sell vegetables at a farmers' market (Wolsey and Lapp 55). The students saw a need in their community and were invigorated to solve it. Their school garden not only benefited the students' health but also sparked a creative energy that poured into improving the community's health as well. Though Bell Gardens is an excellent example, it is not an exceptional example of the impact gardens can have on their community's health. School gardens have seen reduced BMIs in overweight children, increased consumption and interest in vegetables, and increased physical exercise with the time spent playing and working in the garden (Castro 2013).

Personal Growth and Community Building

Just as gardens can provide the tangible benefits of fresh produce, so too can they promote intangible goods such as character development and an increased sense of community. The seed of change starts in the garden and permeates change within the student, the classroom, and the community.

Gardens offer a unique opportunity for students to engage in meaningful and cooperative learning in a setting outside of the traditional classroom. These activities provide opportunities for improved interpersonal skills as well as personal development in leadership, confidence, and sense of self. Teachers, parents, and students alike have reported the change in personal qualities after participating in a school garden program (Blair 21; Robinson et al. 456; Williams and Dixon 212; Wolsey and Lapp 58). In their literature review, Williams and Dixon describe that there were 100% positive effects on

measures such as "motivation, curiosity and wonder, discipline, study habits, problem-solving, life skills. and academic attitudes" (Williams and Dixon 222). In 2017, the Life Lab garden project in California found that over 90% of their teachers agreed that the garden curriculum improved their students' enthusiasm for learning, emotional well-being, sense of pride in their school, communication, cooperation, and motivation to attend schools ("Life Lab Annual Report"). By working on projects in the garden, students learn to work together, be patient with each other, take on leadership roles, and other important skills (Blair 21; Robinson et al. 456; Wolsey and Lapp 57).

Further, our increasingly diverse society calls for a move from a one-size-fits-all approach to education. Garden-based education has space to celebrate skills often overlooked in traditional classrooms, such as spatial awareness, creativity, physical ability, and many others. For students who may not excel in traditional academic settings, the garden can be an equalizer that allows students to contribute their array of skills that may not be appreciated otherwise (Ozer 857). In a virtuous cycle, students' increased self-confidence grown in the garden promotes academic engagement and vice-versa.

Beyond the school, gardens allow for increased engagement with the community. This can extend outside the classroom into a stronger school community and family engagement. As seen in the example in Bell Garden, students engaged their community by growing produce and starting a farmers' market with their harvest. The California School Garden Network manual for starting school gardens, which will be discussed more later, emphasizes the importance of having a strong support system from the start ("Gardens for Learning" 14). The garden requires a lot of effort to develop and maintain. It thrives best with the support of students, families, and community members alike.

Research strongly shows that parent and community involvement positively impacts student academic success (Ozer 858).

Since Urban REAP and Jubilee Market are already established in the community after their few short years in existence, there is potential for increased community involvement. Students who visit Urban REAP for the first time with their class may be able to return to the garden after school or on the weekends to volunteer. With increased interest in the garden, students may begin to develop a sense of community with each other centered on their experiences at Urban REAP. This could, in turn, spur continued connections between the community, school, and Urban REAP.

Environmental Care and Global Engagement

We are partially a product of our environment. Thoreau reminds us of the unity in place, personhood, and pedagogy he found in *Walden* (Orr 183). Place can have a tremendous impact on our personhood and can be a great teacher, if we allow it. When students spend time getting their hands dirty in gardens, basking in the beauty of the world, and understanding the farm to table process, they become increasingly invested in caring for the earth. School gardens offer a platform to learn not only about the water cycle and composting but also about humans' effects on these natural processes. Earthworks, a community garden in Boston, MA, wrote that students involved in garden-based education grow an "appreciation of the value of all living creatures and become protectors of the orchard.... Youth who once ripped plants out of the garden for fun now weed, water, and protect the garden and orchard crops." (Ozer 856).

To add weight to the importance of place, research has shown that adults who had "significant and positive exposure to nature as children [...] were more likely to be environmentally sensitive, concerned, and active," (Blair 18). When children have regular, positive interactions outdoors, they grow an appreciation of and assume responsibility for the earth. Further, research shows that, when teenagers have a connection with a place, they understand the "relation between dependency on the place and environmentally responsible behaviors," (Blair 18). Positive interactions with the environment not only influence people's behaviors in the future but also impact their care for the environment in the present. School gardens offer an opportunity to cultivate an ethic of responsibility and motivate people to care for the earth from an early age.

This benefit of school gardens is most closely related to Urban REAP's mission of modeling small scale food and energy production and training children, youth, and adults how to be better stewards of what we have ("Urban REAP"). According to Urban REAP's website, creation care is a part of the cultural mandate that God gives to the first people in Genesis 1:28 and is an order that, statistically, many Western Christians have failed to uphold. By offering more opportunities for students and families to spend time in the garden and caring for creation, Urban REAP can promote creation care among the community and its importance for the Christian and non-Christian alike.

Additionally, gardens offer many opportunities for children to learn about being a good citizen of the globe and further promote the values of Mission Waco, Mission World. The National Council for the Social Studies defines global education as the study of the interrelated nature of conditions, issues, trends, and processes (Wolsey and Lapp 53). By working in the garden, students persevere through setbacks, think creatively and

resourcefully, and cooperate as a team. These experiences offer a stage to discuss the challenges young people face around the globe (Wolsey and Lapp 58). Classes can wrestle with questions such as, *How different would my family be if we had to grow all of our food? Would I be able to go to school? If I throw plastic in the ocean here, what effect could that have on the environment and people across the world?* Suddenly the globe fits in a small garden and students can consider difficult questions that affect their global neighbors.

By understanding our place in the garden and role in creation care, we can begin to see ourselves in relation to the rest of the world. Learning about the sustainable practices at Urban REAP begs the question of *Why?* that can be answered by looking in our community in the context of the world. What we do in Waco, TX, is important and has lasting effects. This benefit of school gardens aligns closely with the global branch of Mission Waco Mission World. Environmental justice affects not just the local community but also the communities around the globe. Garden education provides a platform to connect local learning to the globe and promote Mission Waco Mission World's goal of serving and empowering those in poverty around the world. By promoting both global and local eco-justice, school gardens promote the driving values of Urban REAP and Mission Waco Mission World.

Academic Outcomes and Bridging the Gap

Though the research on academic outcomes from garden-based education has not been comprehensive, the existing studies have shown many promising results. Further,

garden-based education may be a powerful tool in bridging the academic gap between ethnic and socioeconomic groups (Williams et al. 2).

In a literature review from 2009, 83% of the included studies found positive academic outcomes, including 93% positive effects on science, 80% positive effects in mathematics, and 72% positive effects on language arts (Williams and Dixon). Only 3% of the studies found negative results from their garden programs and 15% reported no effect (Williams and Dixon 219). Nearly half of the studies focused on third through fifth grades. Of the schools studied, 69% were public and at least 15% were considered low socioeconomic status (63% of the studies did not report the socioeconomic status of the school). The results from this systematic review indicate strong positive outcomes from garden-based education.

A few studies since 2009 have focused on the effects of garden-based education in underserved populations. Williams' study in 2018 focused on the efficacy of garden education in increasing students' interests in STEM, a field underrepresented by ethnic minorities. This study found that middle school students from various ethnic and racial minorities found academic re-engagement in the garden and had improved understandings of themselves as competent, related, and autonomous (Williams et al. 12). Williams further argues that garden-based education can augment students' sense of science identity and achievement, thereby influencing their decision to go into STEM-related fields (Williams et al. 12).

A study performed in the Washington D.C. area in 2016 found similar results. Students from low-income and racial minority backgrounds had improved math, reading, and science test scores (Ray et al. 392). Published in 2013, McCarty's research of a

garden program in 92 low-income schools across Texas found 84% of the students had high levels of engagement, specifically in math and science, and had a 5.5% increase in standardized science test scores compared to comparable schools (McCarty 1). Similarly, school aquaponics systems are promising methods of interdisciplinary study for grades K-12 and college. Aquaponics systems have the added benefit of being a technology-centered pedagogy that can aid teachers in reaching the new Next Generation Science Standards (Genello 17).

Longtime educator Susan Engel suggests in her book *The End of the Rainbow* that the solution for higher test scores especially for low-income students is not increasing drills to prepare for standardized tests, even though that is what our system has shifted towards (Engel 7). Rather, helping students see the joy in learning and making lessons relevant to students' lives may go a long way in closing the gap and raising a better society. Offering students an interdisciplinary approach through hands-on learning in the garden may provide students with the self-confidence and knowledge to succeed in school and pursue fields that they have been historically underrepresented in.

The Garden Recipe and an Ecological Framework

The past few sections have focused on empirical evidence for garden-based education outcomes. Here, we will challenge these numbers by taking a step back and acknowledging the holistic nature of garden education and the hidden results that cannot be measured.

In a society driven by numbers, it becomes natural to start valuing things based on a quantitative measurement: How much money does this person make? How fast is this

machine? How many touchdowns has this player thrown? Undoubtedly, these above statistics are important for tracking growth, ensuring efficacy, and gaining support for programs. Cairns, however, introduces the “rhetoric of effect” in her article, *Beyond Magic Carrots: Garden Pedagogies and the Rhetoric of Effects*. Inviting readers to move past a numbers-based evaluation system, Cairns shares her experience with students in community and school gardens and the qualitative, unseen growth she saw in the youth. Though past studies have attempted to quantitatively measure students’ change in confidence, sense of community, and other traits, Cairns reminds us that even the most well-developed surveys and tests cannot capture all of the growth students experience in gardens.

Spending two summers working alongside youth in gardens, sociology researcher Dr. Cairns describes the intangible goods that youth produced in the gardens. The youth had time for silent reflection, meaningful conversation, and lively debates over the issues their community faced. The garden became the mecca of their social interaction and a key part of how the youth began to unpack and understand their lives. Though the youth learned new food knowledge and skills, Cairns' focus groups emphasized the value of "collaborative work over any other rewards derived from their experience" and the "rewards of collective effort in a respectful work environment," (Cairns 528). Other youth emphasized the physical empowerment they felt when they put in hard work and saw the literal fruits of their labor (Cairns 526). The greatest benefits from working in the garden may happen in the hidden conversations and personal victories undetectable from a standardized survey or test. Yet these aspects, of increased self-confidence or sense of

community, may be the transformative factors that influence the type of student and person youth become.

In this context, Cairns shares her garden recipe: "Add children, dirt, and stir to create an enlightened, healthy young consumer," (Cairns 519). Though she does not contest the value espoused by studies on garden education, Cairns proposes that the measurable outcomes miss the larger picture of the gardening experience that youth find the most meaningful (i.e. the community effort in their work, personal development) (Cairns 517). By viewing youth in an ecological context, as individuals in an intricate web of relationships, we can see the potential of garden education. Gardens provide more than an opportunity for hands-on learning to achieve state standards but also provide platforms for personal and community development. Because of the difficulty in measuring these abstract outcomes, the above results may underrepresent the impact gardening had on students' personal growth.

What Does it Look Like in Waco?

As Cairns reminds us, students are a complex web of relationships, influenced by their family, health status, socioeconomic level, and a myriad of other factors. In this light, we examine the environment that students around Urban REAP are growing in. We will look at health metrics as well as demographic information of the community surrounding Urban REAP and the schools present in that district.

Waco's history contains many ups and downs. Located midway between Austin, TX, and Dallas, TX, Waco was in the running for the Texas capital in 1850 (Johnson). The next 100 years brought economic success, a horrific lynching that made national

news, one of the deadliest tornadoes to hit Texas, and a fifty-day siege of the religious community, the Branch Davidians (Embry; Sawyer; Terry; Yeamen). Despite a complicated history, Waco's present is hopeful. As one example, HGTV celebrities Chip and Joanna Gaines have brought national attention back to Waco once again. Their investment in Waco has transformed the city and prompted a budding downtown and growing restaurant scene, among other developments (Burke "Magnolia Market"). Though less prominent on a national stage, Mission Waco has also brought hope and rejuvenation to the streets of Waco. This organization has "been a cornerstone of the Waco community" and has worked with neighborhoods to revitalize their community and empowered the low-income and marginalized (Burke "Mission Waco").

One of Mission Waco's most recent endeavors is the Jubilee Food Market and Urban REAP. Both were created in response to the food insecurity oppressing the community, as discussed in the preface. Though the community around Urban REAP is no longer a food desert, the health issues that come with sustained food insecurity are still present in the community. A study by the Center for Disease Control and Robert Wood Johnson Foundation, called the 500 Cities Project, in 2017 found that the community around Urban REAP had an obesity rate of about 40%, a high-blood-pressure rate of about 35-40%, and a diabetes rate of about 15%. All of these rates are higher than the average of the 500 other cities included in the study ("500 Cities Project").

Waco's health climate has room for growth but, fortunately, Waco's historic resilience proves there is also a willingness to grow. Urban REAP is uniquely located and equipped to start addressing many of the health risks community members face. One way Urban REAP can attain this is by connecting with local schools through garden-based education.

This can impact students' emotional and physical well-being, academic achievement, and environmental stewardship, as detailed above, and create changes in their families and, in turn, their communities. Before detailing garden-based education at Urban REAP further, we will examine the ecological framework of Waco to understand the need for a program such as garden-based education.

The following measurements come from City Health Dashboard, a program that studies various metrics of health in urban areas. Below are four of those metrics for Waco, TX, and, when applicable, the measurement (or range of measurements) for Urban REAP's zip code, 76707.

In the first table, the chosen metrics are tied to the student demographics in Waco: Their reading proficiency in third grade, chronic absenteeism, and poverty rates.

The second table reveals more aspects of families' health environments and income levels: Their access to healthy food, their potential of lead risk, and income inequality. *Note that the data for the community's access to healthy food was recorded the year before Jubilee Market opened in the food desert surrounding Urban REAP and does not reflect this addition.*

The final graph illustrates Waco's racial composition.

Chosen student demographics in Waco, TX.

City Health Dashboard			
	Third-Grade Reading Proficiency (2016)	Chronic Absenteeism* (2016)	Children in Poverty (2017)
Waco Average	57.70%	15.60%	34%
76707 Zip Code			41-61%
Average Across Dashboard Cities	46.2%	18%	22.8%

**Chronic Absenteeism is defined as “Public school students who miss ≥ 15 days of school in an academic year” and is measured on a city-wide scale.*

Data taken from: “City Health Dashboard.” *City Health Dashboard*

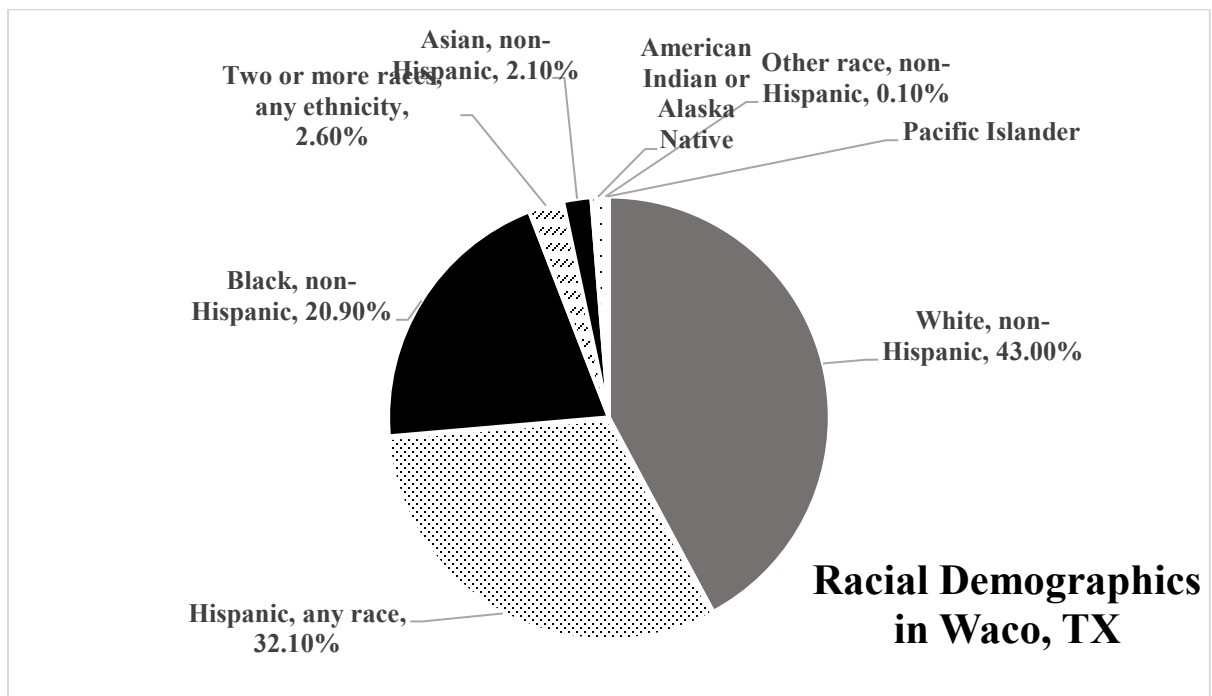
Chosen Demographics of Waco, TX, with Emphasis on Urban REAP’s Zip-Code 76707

City Health Dashboard			
	Limited Access to Healthy Food (2015)	Houses with Potential Lead Risk (2017)	Income Inequality* (2017)
Waco Average	91%	17.70%	-27.3
76707 Zip Code	100%	25-43%	(-53) - (-21)
Average Across Dashboard Cities	61%	18.7%	-5.6

**Income Inequality is measured as “Households with income at the extremes of the national income distribution (the top 20% or bottom 20%).” A score of -100 signifies a community where all households are in the deprived category while +100 signifies all households are in the privileged category. A score of 0 means that there is an equal number of both deprived and privileged households in the area, or that the households fall in a median category.*

Data taken from: “City Health Dashboard.” *City Health Dashboard*,

Racial Composition in Waco, TX

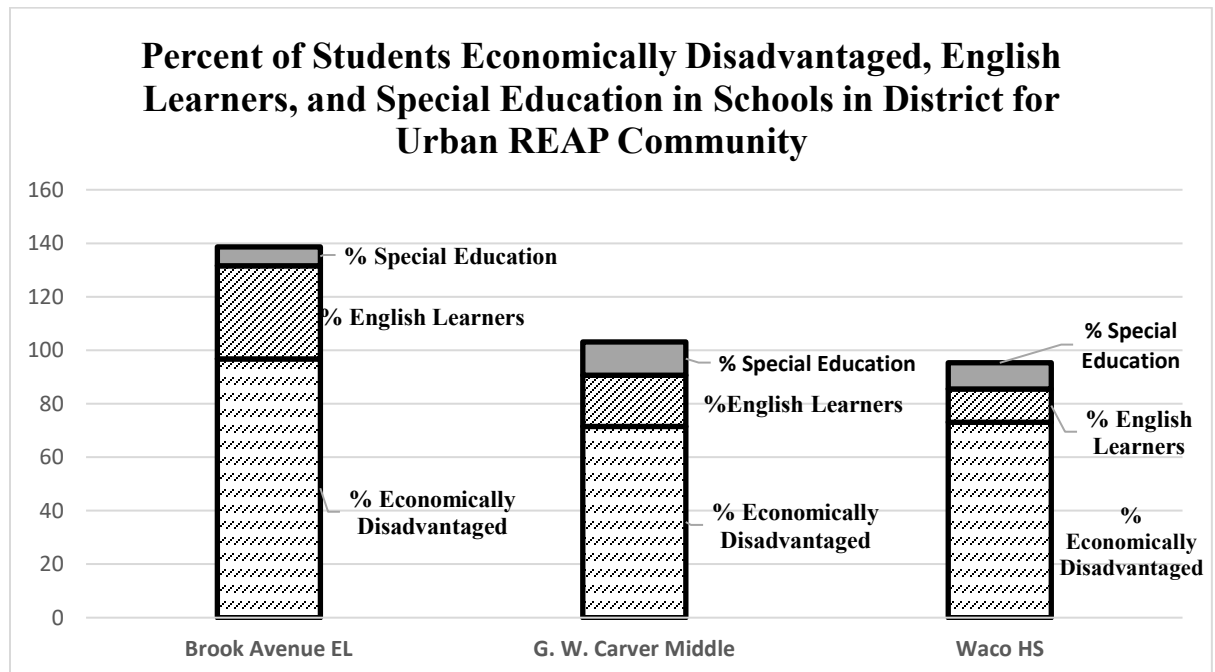
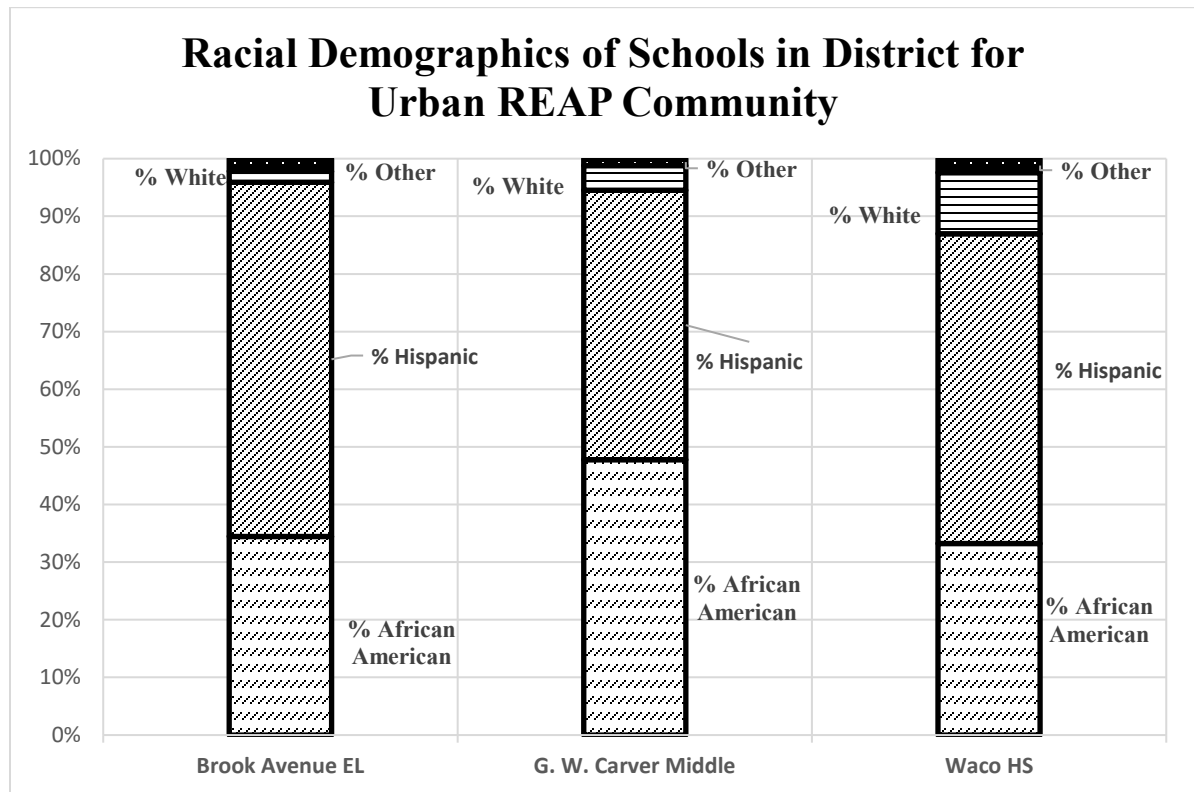


Categories are not mutually exclusive, so population percentages may not sum to 100.
 Data taken from: "City Health Dashboard." *City Health Dashboard*

Though the data is not inclusive of every health and education metric that could describe a city, these numbers may provide a starting point. The high poverty rate in Waco (26.8%) is well above the national average (13.4%) and state-wide average in Texas (16%) ("Poverty in Waco, Texas"). This is reflected in the high childhood poverty rate, limited access to healthy food, potential houses with lead, and large income inequality seen above.

Looking directly at K-12 education, the schools in the district where Urban REAP is located are Brook Avenue Elementary School, G.W. Carver Middle School, and Waco High School. Their school ratings for the 2018-2019 school year are C, F, and B, respectively. These scores are based on students' performance on the STAAR test and student mobility. Specific demographics, such as student racial composition and the

percent of students who are economically disadvantaged, English learners, or in special education are shown below.



Data from: "Waco Independent School District." Waco Independent School District,

Though some of these statistics may look bleak, there are many stories of rejuvenation coursing through Waco that promise a brighter future to come. The poverty rate in Waco has continued to decline since a spike in 2011 (“Poverty in Waco”); Prosper Waco has data-driven initiatives to improve health, education, and financial security in the Waco community ([“The Mission”](#)); and organizations such as Mission Waco continue to invest in the city and empower members to flourish.

Urban REAP has a unique position to not only connect with schools but also connect with the community. Since it is not on a school campus but directly next to a neighborhood, Urban REAP may be a great connecting point for everyone in the community- students and families alike. With the potential for garden-based education to improve the area’s health, sense of community, and stewardship of creation, an increased connection between Urban REAP and schools can lead to benefits for the whole community.

For the following chapter, we will explore creation care as one of the benefits of garden-based education most closely tied to Urban REAP’s mission. After, we will discuss intellectual virtues as a connection between creation care and the character development promoted with garden-based education.

CHAPTER TWO

Creation Care

Waco's health and educational outcomes discussed in the previous chapter reveal important systematic disparities that oppress disadvantaged populations. Rightfully, the disparities call for social justice and equity. Though the term "social justice" often conjures up ideas of human equality, an important yet often overlooked part of social justice is ecology. Kevin O'Brien writes, "'Ecology'- the sum of Earth's ecosystems and processes- is inherently and inseparably linked to 'justice'- the work of ensuring fairness and equity between all peoples," (O'Brien 140). An ecological justice reminds us that we are not the only tenants of the earth. Rather, we live in a connected system and are responsible for upholding justice in our relationships with humans and non-humans alike.

As one of the pillars of Urban REAP's mission, "creation care" is Christianity's realization of ecojustice. Yet, as Urban REAP quotes from *Christianity Today*, "White evangelicals now consistently poll among the least concerned about such [environmental] issues," ("Urban Reap" ; Murdock). Environmental concern has become associated with secular goals and grown distant from the Christian's mission. Joseph Sittler, however, describes care for the earth as integrally important to Jesus Christ and his church (Sittler 4).

In the following sections, we will explore the place of creation care in the Christian's life and the importance of ecojustice. We will begin by describing the need for creation care and the attitude of creation care. We will then explore the biblical basis of

creation care and address the critiques of Christianity's negative impact on the creation. We will then end by connecting creation care with education and the role garden-based education can have in cultivating virtues of ecojustice.

The Need for Creation Care

Though we will only scratch the surface of the environmental issues facing our world, we will consider air pollution, loss of biodiversity, and clean water as examples of our “environmental crisis.” In doing so, we will reveal the need for creation care.

According to the United Nations (UN), nine out of ten people across the globe “are exposed to levels of air pollutants that exceed World Health Organization safe levels,” that can have severe effects on people’s mental and physical health, “disproportionately affect[ing] people in developing nations,” (“Air Pollution”). The World Air Quality Project discovered that fewer than thirty countries have “good” levels of air pollution while thirteen countries have levels ranging from “unhealthy” to “hazardous” (“Top 10 Countries”). As the UN describes, air pollution has caused a “major global health epidemic” and has had negative impacts on climate change and economies (“Air Pollution”).

Another critical issue facing the environment is the drastic loss of biodiversity. There are an estimated one million species that are threatened with extinction, according to a global assessment by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (“Media Release”). Deteriorating at an unprecedented rate, the global loss of biodiversity will have significant negative effects on human health and food security (Roe 288; “Media Release”).

As one final example, we will consider water loss and water pollution. The World Wildlife Foundation reports, “Half of the world’s wetlands have been destroyed since 1900,” (“Water Scarcity”). Further, there is an increasing amount of microplastics in the ocean that affect marine life and, likely, the humans and non-humans who ingest them (GESAMP 64). Both water loss and contamination have detrimental impacts on ecosystems, both locally and globally (GESAMP 65; “Water Scarcity”). The result of so much water loss and pollution has made billions of people across the globe without adequate access to water or proper sanitation (“Water Scarcity”).

All of these environmental issues are in large part attributable to human actions. Through inefficient irrigation in agriculture, pollution from pesticides and industrial waste, burning of fossil fuels, and other acts, humans have negatively impacted the environment and the living creatures in it (“Air Pollution” ; “Health, Environment” ; “Media Release” ; “Water Scarcity”). The Health, Environment and Climate Change coalition (HECC) cites that 12.6 million deaths are caused by environmental risks each year (“Health, Environment”). Though the environmental story is not entirely doom and gloom, theologian Steve Bouma-Prediger believes “the overarching conclusion is not pretty,” (Bouma- Prediger 55). Creation is groaning and it seems that humans are a large reason why.

The Attitude of Creation Care- Anthropocentrism and Theocentrism

In response to the IPBES report of the extreme rate of biodiversity loss detailed above, IPBES Chair Sir Robert Watson said:

“The Report also tells us that it is not too late to make a difference, but only if we start now at every level from local to global. Through ‘transformative change’, nature can

still be conserved, restored and used sustainably – this is also key to meeting most other global goals. By transformative change, we mean a fundamental, system-wide reorganization across technological, economic and social factors, including paradigms, goals and values,” (“Media Release”).

There is a pressing need for greater creation care. Though he does not specify the paradigms, goals, and values he would transform, Watson’s call to action mirrors what many Christian eco-theologians argue for: A paradigm shift from an anthropocentric to a theocentric worldview.

Before exploring theocentrism, we will first examine the anthropocentric perspective that characterizes much of our society. The anthropocentric understanding of the environment has its roots in the Enlightenment of eighteenth-century Europe. Armed with science and a reinvigorated value of rational thought, people became disenchanted with nature, viewing it as a means to a human end and at humans' disposal (Boddice 322). This instrumental reasoning has led to an exploitation of the environment that is justified in the advancement of human society (Boddice 324).

Because this understanding is so entrenched in our world, it is difficult to reject an instrumental value of creation and value nature for its inherent worth (Young 116). Even proponents of environmental protection often find primary motivation in anthropocentric goals. In their forum “Social Justice in an Open World,” the United Nations calls for ensuring “that growth is sustainable, that the integrity of the natural environment is respected, that the use of non-renewable resources is rationalized, and that future generations are able to enjoy a beautiful and hospitable earth,” (7). Though a valuable goal, the ultimate end of their environmental justice appears to revolve around future

human enjoyment. At the very least, their failure to mention justice for the non-human creatures implies an instrumental and anthropocentric perspective.

Dr. Richard A. Young captures this anthropocentric tension when he writes:

“The anthropocentric predicament is somewhat paradoxical on two accounts. First, concern for personal well-being and survival has raised ecological awareness to the level that many now question the anthropocentric basis for modern society. The motivating factor for change (self-preservation) and the source of the problem (self-preservation) therefore only accentuates self-centredness, and the root of the problem does not go away. [...] There has been much environmental activity recently, but most of it is, in one way or another, still anthropocentric. Anthropocentrism seems to be so entrenched in society that there is an ingrained resistance against accepting the observation that humanity’s priority on self is self-destructive” (Young 117).

Young reveals our need for the “transformative change” that Watson called for. For the Christian, this means transforming from an anthropocentric to a theocentric worldview. Doing so requires rejecting the human deification in anthropocentrism and recognizing the One whose throne is in heaven and whose footstool is the earth (Isaiah 66:1). Understanding God as the source and ruler of all things reveals the interrelatedness of creation and leads to the ecology justice described earlier (Young 26, 274). As Dieter Hessel describes this concept:

“Eco-justice occurs wherever human beings receive sufficient sustenance and build enough community to live harmoniously with God, each other, and all of nature, while they appreciate the rest of creation for its own sake and not simply as useful to humanity,” (Hessel 9).

Theocentrism replaces instrumental value with inherent value. Creation is good not because of what it offers to humans but because the all-knowing God declared it as “good,” (Genesis 1-2).

This counter-cultural, transformational perspective must initiate the care of creation that the world needs and that the Christian is called to. Yet, as Urban REAP

points out, many Christians have historically failed to fulfill this "cultural mandate" from Genesis 1:28 ("Urban REAP"). Urban REAP provides many tangible goods as it addresses food security and sustainability. But a crucial part of their mission is to also educate people in creation care and inspire an ethic of responsibility for the earth ("Urban REAP"). This goal reveals the importance of garden-based education for students at Urban REAP. In the garden, the place where God originally declared all things "good," students can connect with creation and enjoy it for its own sake. With an intentional curriculum, educators can help students understand the inherent value of nature and develop an ethic of responsibility to properly care for it. In the following sections, we will flesh out the cultural mandate from the creation story and its corresponding ethic of responsibility.

The Cultural Mandate and the Theology of Common Grace

“God blessed them and said to them, “Be fruitful and increase in number; fill the earth and subdue it. Rule over the fish in the sea and the birds in the sky and over every living creature that moves on the ground.” (Genesis 1:28)

Spoken to Adam and Eve immediately after they were formed from dust, this verse is often referred to as the cultural, or creation, mandate. In his brief article connecting Urban REAP’s mission of sustainability to creation care, Dr. Jimmy Dorrell writes, “The theology of common grace assumes that Christian justice demands that the creation must be protected,” (“Urban REAP”). According to theologian Louis Berkhof, the theology of common grace explains why there is a “natural course of life” that, though separate from the redeemed Christian life, “exhibits many traces of the true, the good, and the beautiful,” (Berkhof 477). Common grace is a gift from God that every

person inherently has (Berkhof 481). With common grace, every person has “the light of God’s revelation” that guides people’s consciences as they have the “law written on their hearts,” (Berkhof 487; Romans 2:15). This gift manifests itself as a sense of morality and truth as well as the ability to act righteously in civil or natural affairs (Berkhof 489). In this way, the commonality of the creation story implies the commonality of grace which brings forth the fruit of a sense of justice and morality. Though not everyone is a Christian, everyone is guided by a glimmer of inner light given by God. If the Christian mission and ecology are linked, as O’Brien proposed, then every person has a semblance of the ecojustice that stems from a proper theocentric view of the world.

Though not every student that visits Urban REAP will be a Christian, every student will share in a common grace from God. Creation care is not exclusive to the Christian but, insofar as it acts towards ecojustice, is embedded in each person with the common grace to act rightly.

To further understand the cultural mandate, we will parse through God’s invitation for Adam and Eve “to subdue and have dominion over” and “to work and take care of” the earth (Genesis 1:28, 2:15).

To Subdue and Have Dominion Over

Though the word “dominion” often has authoritative and exploitive connotations, we must examine the type of dominion God models in the Bible (Gnanakan 51). God rules as a shepherd keeps its sheep, in a close and caring relationship. Ezekiel 34 presents the opposition between God’s tender shepherding and those who have ruled “harshly and brutally” (Ezekiel 34:4). Interestingly, the Hebrew word *radah* appears in both Genesis

1:28 and Ezekiel 34 as “rule.” In Ezekiel 34, however, *radah* is connected to God as the caring shepherd, not with the oppressive leader (Gnanakan 54). The “rule” or “dominion” God bestowed in Genesis 1:28 has connotations of a caring and just ruler rather than a dominating oppressor.

To Work and Take Care of

Further, God sanctions Adam and Eve’s dominion in the context of servanthood. The creation story in Genesis 2 provides a nuanced command from Genesis 1:28. In Genesis 2:15, we read that man was put in the Garden of Eden “to work it and take care of it.” The Hebrew word *abad*, often rendered as “to work” or “to till,” shares the same root as the word for “servant” or “slave.” Further, the Hebrew word *shamar*, translated as “to take care of” or “to keep,” shares the same root as the word “steward” or “trustee” (Gnanakan 55). Understanding these instructions reveals God’s intention for humans to care for, rather than consume, the land.

To further unpack the role of a “steward,” we turn to Jesus’ teaching in Luke 14:

And the Lord said, “Who then is the faithful and wise manager, whom his master will set over his household, to give them their portion of food at the proper time? Blessed is that servant whom his master will find so doing when he comes. Truly, I say to you, he will set him over all his possessions. But if that servant says to himself, ‘My master is delayed in coming,’ and begins to beat the male and female servants, and to eat and drink and get drunk, the master of that servant will come on a day when he does not expect him and at an hour he does not know, and will cut him in pieces and put him with the unfaithful. And that servant who knew his master’s will but did not get ready or act according to his will, will receive a severe beating.” (Luke 14:42-44, 47).

In this teaching, Jesus outlines the proper role of a servant-manager, or steward. The master did not set the steward over his household simply to watch it but to give the fellow housemates “their portion of food at the proper time.” The unrighteous steward, in

contrast, “beat the male and female servants” and ate and got drunk for pleasure. The master did not privilege the steward with responsibility so that the steward could abuse the power for self-serving purposes and oppress others. Rather, the master expected his steward to responsibly care for those in the household so that they may have provision “at the proper time,” just as the master would do.

This parable reveals the communal responsibility of stewardship. Our privilege of having dominion over, keeping, and caring for the earth does not sanction an oppressive rule over the land for our pleasure. Rather, the role of a steward ought to be completed for the good of those we are stewarding over and with.

Further, the communal aspect of stewardship reveals the stewards' lack of ownership of the masters' possessions. In recognizing our role as stewards, we must recognize that all ownership and authority belong to God; any responsibility or temporary ownership we have comes as a gift from above. Drawing from an example from contemporary law, Gnanakan writes, "Some legal trusteeship documents even today will declare that the signatory gets no direct benefits from the engagement." (Gnanakan 132). God did not grant Adam and Eve stewardship solely for their gain but for proper care and respect for those around them, both human and non-human creation alike.

Thus, God's command for humans to “have dominion over,” “subdue,” “work,” and “take care of,” the earth does not represent God's sanction for people to have free reign over creation. These instructions come within the context of a God who “has dominion” as a loving shepherd; a God who rewards the faithful steward who justly distributed and “took care of” the masters' possessions rather than selfishly abusing them for the servant's personal gain. With a better understanding of God's gift of stewardship

to His image-bearers, we will now consider the disconnect between God's mandate and the traditional anthropocentric stance Christians have taken. We will then examine the responses to anthropocentrism that have resulted in alternate worldviews and oppressive relationships. Finally, we will look at ecological education as a method to promote creation care and rectify an anthropocentric worldview.

Understanding the Cultural Mandate

After analyzing Genesis 1:28, 2:15, we have a better grasp on the nuances of the cultural mandate. God's picture of "subduing and dominion" exudes a shepherd's love while His pattern of "working and taking care of" reflects a self-less charity for the good of others. God has granted common grace so that every person may join in caring for the earth and restoring ecojustice.

The Disconnect

Even though God's first words to humankind involved a command to take care of the earth, Christians have failed to uphold the mandate. Wendell Berry writes, "Christian organizations, to this day, remain largely indifferent to the rape and plunder of the world and its traditional cultures... The certified Christian seems just as likely as anyone else to join the military-industrial conspiracy to murder Creation," (Berry 94). Though the cultural mandate includes all people, Christians are especially responsible for carrying out God's command. Christians' complicity in the exploitation of the earth has muddled the distinction between the redeemed and the lost. In failing to pursue eco-justice, they

have damaged their witness and have contributed to the oppression of disadvantaged groups.

As evidence of the damage to the Christians' witness, the ecologist Lynn White Jr. famously wrote in 1966, "Especially in its Western form, Christianity is the most anthropocentric religion the world has seen," ("The Historical Roots" 62). The high volume of references to White's essay since 1966 confirms the connection many people see between Christianity and the ecological crisis (Bouma-Prediger 62). White articulates complaints that many people hold about Christianity's negative impact on the environment. Through Christians' historically poor stewardship and a failure to uphold the cultural mandate, Christianity's identity of a revolutionary theocentric worldview has been accused of being the most anthropocentric religion. The major criticisms of Christianity's impact on the environment, curated through Ken Gnanakan's and Steve Bouma-Prediger's works, are summarized in the table below.

Alternatives to an Anthropocentric Christianity

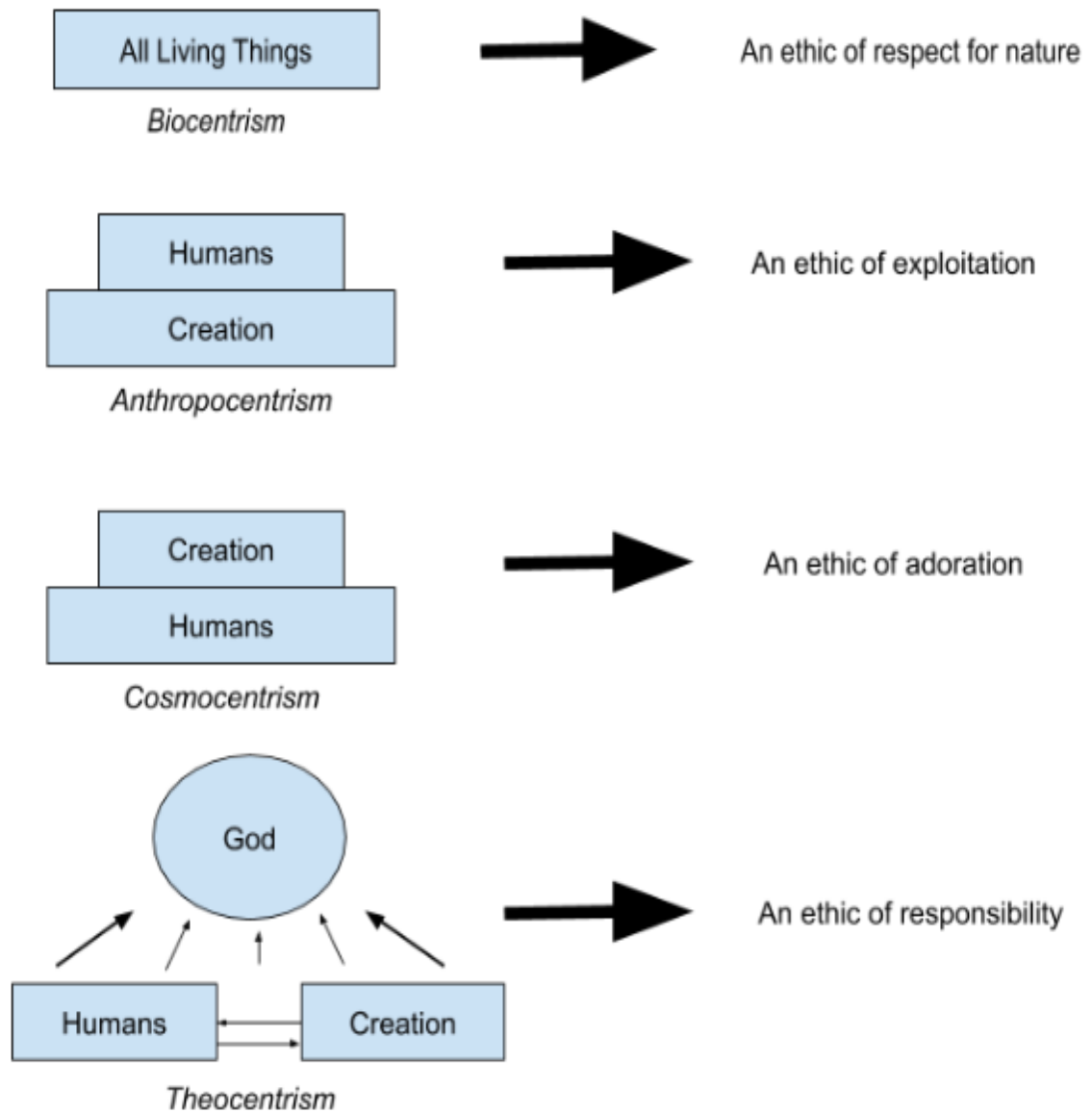
In opposition to an anthropocentric Christianity, worldviews of biocentrism and cosmocentrism began taking root.

On the opposite extreme of anthropocentrism, cosmocentrism dignifies creation above humanity. By valuing the cosmos above all else, the greatest good becomes the good of nature. This view removes the self-centered failure of anthropocentrism but diminishes God's image-bearers to a place subservient and inferior to the rest of creation. This, H. Paul Santmire describes, leads to an "ethic of adoration" towards an unrighteous end (Bouma-Prediger 112).

Taking a more middle ground, biocentrism seeks to equate all creation as equally necessary and valuable in the dynamic web of life. This espouses an intrinsic value for all of creation and a humbling view of people as equally interdependent on the rest of creation (Gnanakan 124). Having an equal view of nature leads to an ethic of respect for nature.

Below is a table of the four worldviews discussed and their corresponding ethics: Biocentrism, anthropocentrism, cosmocentrism, and theocentrism. Following this is a summary table of the four most prominent criticisms of Christianity's negative impact on the environment.

Four worldviews and their corresponding ethics.



The four most prominent criticisms of Christianity's negative impact on the environment.

<i>ARGUMENT</i>	<i>DESCRIPTION</i>
The creation story allows Christians to have a “shallow” ecology, valuing creation only for its usefulness to humans.	An anthropocentric reading of the creation story views the all creation preceding humans as subservient and utility. The alternative to a shallow ecology is a deep ecology. Proposed by Arne Naess, this biocentric view holds that every living creature is in equal value (Gnanakan 20).
Monotheism, particularly Christianity, wrote a narrative that allowed people to ravage the earth.	Similar to the previous argument, this idea is rooted in Genesis 1-2. The cultural mandate to “have dominion over” can be interpreted as a sanction to abuse creation if not read carefully. Wallace Stegner contrasts the domination narrative with the Native American emphasis on nature’s sacredness. Whereas the Native American worldview championed an integrated web of humans, creatures, and land, the Christian perspective developed a hierarchy (Bouma-Prediger 60).
The recurrent dualism in Christianity devalues material/earthly things while the Christian eschatology negates investing care into creation. Both of these sanction people’s destruction of the earth.	The dualism between body and spirit in Christianity has followed Plato’s example and valued the spiritual over the physical (see Matthew 6:19-20, Romans 8:9, Colossians 3:2). Further, the end of the Christian narrative seems to render any investment in the earth useless. Roderick Nash writes, “Indeed Christians expected that the earth would not be around for long. A vengeful God would destroy it, and all unredeemed nature, with flood or drought or fire. Obviously this eschatology was a poor basis from which to argue for environmental ethics in any guise. Why take care of what you expected to be obliterated?” (Bouma-Prediger 63).

	<p>Together, the dualism of the spiritual over physical and the anticipated destruction of the earth render any effort to restore the earth as useless.</p>
<p>Christianity aided in the rise of Western science and technology and, with these innovations, increased the exploitation of the earth.</p>	<p>Christianity influenced the rise of technology in two ways.</p> <ol style="list-style-type: none"> 1) Christian dualism holds humans over non-human creation. This disparity justified human innovation at the expense of non-human creation (Bouma-Prediger 61). 2) Christians view nature as revelation of God's character. Thus, studying the inner-workings of creation allows further understanding of the mind of God (Bouma-Prediger 61). <p>Under the guise of desiring to know God more, humans exploited creation and justified their actions with references to their inherent superiority and right to dominion (Bouma-Prediger 62).</p>

Summary of the Four Primary Arguments Against Christianity's Environmental Impact

These four points represent the main criticisms of Christianity negatively impacting environmental care. Though all distinct, they share an underlying theme of anthropocentrism and domination that enable people to abuse the earth for their gain. At the basis of these arguments, we see a hierarchy that always sets humans above non-human creation. This understanding has been used to justify the exploitation of the earth for human gain.

In the following section, we will consider three forms of oppression that have arisen from a similar, human-made hierarchy of values. Extending the dualism discussed in the second argument, the domination of spiritual over physical can describe the oppression of man/woman, white/non-white, and rich/poor, where the second half in each pair is inferior to the first (Bouma-Prediger 61).

Eco-Injustice as Oppression

Oppression of Poor. Present in both the national and local levels, inequalities in eco-justice disproportionately affect the poor.

On a national scale, the duality between rich/poor is seen in the exploitation of poor countries in the name of further developing rich countries. Countries may choose, for instance, to dump their toxic waste in countries that have not yet established environmental restrictions (Gnanakan 137). Environmental regulations have not eliminated the negative environmental impacts but have instead swept them under the rug of poorer, less restricted countries. A tragic example of this is the gas leak in Bhopal, India, in 1984 from the Union Carbide Corporation (UCC) plant (Diamond; Gnanakan

144). Though the local population may have received job opportunities and capital, the plant posed large environmental risks that went unchecked because of India's less stringent environmental laws. Because the United States exploited Bhopal's residents with cheaper wages and dangerous environmental hazards, the Bhopal region experienced tremendous health-effects and environmental damages. The Bhopal incident, among others, represents the international effects of eco-injustice and the effect it has on impoverished nations.

As a local example, we look to the example of the Flint, MI, water crisis. This tragic event illustrates the disproportionate influence environmental factors have in poor areas (Cairns 522). Likely without the resources or time to advocate for eco-justice, low-income neighborhoods are disproportionately affected by negative environmental determinants.

Oppression of Non-White. In addition to the financially impoverished, the effect of eco-injustice has had a disproportionate effect on racial minorities. Hazardous waste facilities, for example, are most significantly correlated with the racial demographics of a neighborhood (Austin and Scholl 69). Austin and Scholl write, “Poor black and brown people throughout this nation are bearing more than their fair share of the poisonous fruits of industrial production... they are poisoned by the air they breathe, the water they drink,” (69).

Oppression of Women. Eco-feminists link the abuse of mother-earth with the oppression of women and advocate for both the equality of women and proper care for

the environment (Gnanakan 150). Rosemary Radford Ruether, an eco-feminist theologian, attributes patriarchal domination as a product of the biblical narrative. Eve's creation and Israel's laws illustrate the norm of female subjection in Israel (Gnanakan 150). To resolve the issue of hierarchy and male domination of both women and nature, Ruether calls for a resolved view of God. She writes, "Only when we have come to understand that God is the source and the foundation calling us to live in relationships of mutual support can we effectively rebuild our vision of the world," (Gnanakan 151). With a rejection of traditional Western-Christianity, many eco-feminists turn to indigenous African and Asian spiritualities that affirm the value, inter-relatedness, and sacredness of all creation (Gnanakan 152). Emphasizing the deep connection between God and earth, these spiritualities recognize earth's life-giving powers and call humans to become "co-creators with God and nature" (Gnanakan 154).

An Ecology of Broken Relationships

At the heart of the ecological crisis, we see broken relationships that have led to domination and oppression of the earth, women, non-white people, and economically disadvantaged populations. The source of eco-injustice lies in an anthropocentric worldview and an instrumental value of creation.

Rectifying these injustices must involve rewriting a standard of mutuality among all people and creation. Similar to Sittler's connection between Jesus and ecojustice, the environmentalist Stephen Hawking learned from a Native American: "[T]he division between ecology and human rights was an artificial one, and that the environmental and social justice movements addressed two sides of a single larger dilemma," (Regan 80). In

a divine ecology centered in God, social justice and eco-justice must go hand-in-hand. In a beautiful reversal of the anthropocentric worldview, the theocentric view of Christianity illustrates the innate worth of every creature and finds justice in the relationships among every creature.

The ecology of relationships in the neighborhood surrounding Urban REAP may also be complicated, peppered with histories of racism, economic inequality, sexism, or several other injustices. With an understanding of the cultural mandate to restore relationships, however, Urban REAP and other community members can be equipped to reconcile broken relationships and bring healing to a hurting system.

Ecojustice in Garden-Based Education

How can students be a part of the system that restores broken relationships? Further, how can they become adults who properly steward creation and promote eco-justice? One solution is garden-based education. By bringing lessons to the garden, educators can help students appreciate creation for its inherent worth and cultivate an ethic of responsibility (Mitchell and Mueller 194; Mueller 359).

David Orr's understanding of the United States' "ecological crisis" stems from an "education crisis" (Mitchell and Mueller 193). Schools should equip students with the ability to live sustainably and inspire a desire that motivates them to do so. To cultivate students' care for creation for its inherent worth, students must first step into nature and become acquainted with it. Environmental advocates such as Rachel Carson and Henry David Thoreau learned to love nature by spending time in it and growing in admiration of its aesthetic beauty (Mueller 359). In growing to love the earth, sustainability is no longer

a last-minute effort to salvage the ecological crisis but a natural response in wanting to preserve the dignity of creation (Mueller 359).

Cultivating a proper attitude of creation care begins the mental shift from an anthropocentric worldview and fights the oppression described above that stemmed from the eco-injustices of an anthropocentric world. As students understand their place in the complex and interdependent web of life, they can grow in eco-justice that fights for righteous relationships between humans and nonhumans. This process happens when they see relationships of care and respect modeled in the classroom (Mitchell and Mueller 198). As Orr believes, "All of education is environmental education," (Orr 89). The environment a student learns impacts their academic achievement, personal growth, and the way they perceive the world. By modeling an ethic of responsibility at Urban REAP, educators can shape students into caring stewards of creation who advocate for just relationships among all creation, human and non-human alike.

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Virtue as Part of the Attitude of Creation Care

Though we have explored the meaning of the cultural mandate earlier, we will parse this call out further by considering specific virtues that are associated with creation care. Drawing from Aristotle's discourse on virtue in *Nichomachean Ethics*, Bouma-Prediger describes virtue as "a settled disposition to act excellently - a state of praiseworthy character developed over time," (Bouma-Prediger 132). The virtues associated with creation care do not come instantaneously but are developed incrementally as people strive for ideals such as benevolence, justice, courage, and others.

In the life of a student, we recognize a specific form of virtues called “intellectual virtues.” These dispositions manifest in virtuous thinking processes and learning, such as approaching the world with intellectual open-mindedness, intellectual humility, and so on. Intellectual virtues, similar to any other type of virtue, contribute to people’s ability to properly care for creation and develop an ethic of responsibility, as will be discussed in the following chapter.

Yet, in a community like the one around Urban REAP, intellectual virtues serve an additional purpose. Historically, students from low-income or minority backgrounds become disengaged earlier and more frequently than their wealthier and majority counterparts. This may describe many of the students in the community surrounding Urban REAP. A meaningful pedagogy based on virtue may reinvigorate students’ interest in learning. When framed under the context of cultivating life-long virtue, all activity in the classroom becomes relevant to the students’ lives. Rather than learning a mathematical concept for the standardized test at the end of the year, students may practice the mathematical skill to develop intellectual tenacity. By connecting students’ strive for virtue today with the person they will become tomorrow, teachers can both form students’ personhood and re-engage them in academic learning.

The following chapter will explore intellectual virtues as an integral part of creation care that can reinvigorate students’ learning to achieve both academic success and personal growth.

CHAPTER THREE

Intellectual Virtues

As the past chapter explored the need for an attitude of creation care, this chapter will focus on intellectual virtues as both a subset of and impetus for creation care. As we grow in intellectual virtues, we view the world through a more open-minded and thoughtful lens. Recognizing the negative effect we may have on the environments and injustices that disproportionately affect poor and minority populations requires a great deal of intellectual humility. Intellectual attentiveness helps us realize the environmental effects of even our smallest actions. Being intellectually careful improves our ability to research the source of our food and other products and decide whether it has been sourced responsibly and ethically. Cultivating an intellectually virtuous mindset will require that we consider every action thoughtfully. When combined with an eco-justice education described earlier, intellectual virtues can augment a person's ability to live sustainably and an attitude of creation care. By promoting both creation care and intellectual virtues, Urban REAP can inspire better stewardship of the earth and personal growth in every person who enters into the garden.

Further, intellectual virtues augment the Christian's ability to love God and love others (Stott 29). Having virtuous thoughts in a mind transformed after Christ's mind results in a new lens to view our God, community, and world. Intellectual thoroughness powers our desire to learn more about God and the life He calls Christians to live. Intellectual courage empowers us to advocate for our neighbors when we realize systemic injustice that has oppressed them. Far from being an isolated, sterile pursuit reserved for

scholars in their studies, intellectual virtues inform and improve the way we interact in our community. We think every day and in every action - Learning how to think well translates into learning how to live well. In Urban REAP's community-centered focus, raising good neighbors is integral to their mission.

By promoting students' attitude of proper creation care through intellectual virtues, Urban REAP can impact the way students learn, interact with their community, take care of the environment, and love their God. The following section will discuss what intellectual virtues are. We will then describe the need for them in education and look at examples of schools that have successfully incorporated intellectual virtues into their pedagogy. These discussions can serve as resources for leaders at Urban REAP or educators as they navigate an intellectually virtuous education.

Intellect Pleasing to God- A Part of Creation Care

As discussed in the previous chapter, God calls humans to care for creation and take responsibility for our actions. Let us not neglect, however, that humans are a part of creation and taking care of ourselves is a necessary extension of creation care. One of the unique gifts God gave to humans is the mind and potential to think rationally. Scripture repeatedly calls people to be intellectually different from animals:

Do not be like the horse or the mule, which have no understanding but must be controlled by bit and bridle or they will not come to you. (Psalm 32:9)

Neglecting the development of our minds is a poor use of our talents and denigrates our unique position in creation. Rather, the mind should be a conduit for Christians to develop a further relationship with God (Stott 28). Although humans may have been created with a perfect intellect, our mind, along with our body and soul, fell

after sin entered the world. Just as with caring for the rest of the fallen creation, we are called to care for our minds and continually renew it towards Christ (Romans 12:2).

Focusing on the transformed mind, Paul calls the Colossians to "put on the new nature, which is being renewed in knowledge after the image of its creator" (Colossians 3:10). Further, Paul contrasts the futile thinking of the gentiles, who "are darkened in their understanding and separated from the life of God because of the ignorance that is in them," with the renewed minds of the Christians, who have taken off their old ways in following truth and are "made new in the attitude of [their] minds," (Ephesians 4:17-24). And, in Jesus' words, the first and greatest commandment is: "To love the Lord your God with all your heart, with all your soul, and with all your mind." (Matthew 22:37). Stott cites Paul's numerous references to knowledge, wisdom, discernment, and understanding throughout his epistles as "no doubt that the apostle regarded these as the very foundation of the Christian life" (Stott 28).

People's minds and thoughts matter to God and are a part of the transformation that happens in response to salvation. The thought process ought to be restored and follow righteous patterns of thought that honor God. Drawing on the epistles, Stott articulates the centrality of mind to Christianity. Consider the following verses:

I keep asking that the God of our Lord Jesus Christ, the glorious Father, may give you the Spirit of wisdom and revelation, so that you may know him better. I pray that the eyes of your heart may be enlightened in order that you may know the hope to which he has called you, the riches of his glorious inheritance in his holy people, and his incomparably great power for us who believe. (Ephesians 1:17-19)

His intent was that now, through the church, the manifold wisdom of God should be made known to the rulers and authorities in the heavenly realms (Ephesians 3:10)

His divine power has given us everything we need for a godly life through our knowledge of him who called us by his own glory and goodness [...] For this very reason, make every effort to add to your faith goodness; and to goodness, knowledge; and to knowledge, self-control; and to self-control, perseverance; and to perseverance, godliness; and to godliness, mutual affection; and to mutual affection, love. (2 Peter 1:3, 5-7)

The repetition of knowledge and wisdom in these few passages point to the importance of knowledge not only in beginning to know God but in growing in relationship with God. Further, 2 Peter 1:5 mirrors the model of intellectual virtues discussed earlier: It is not enough to simply have knowledge but we must have the qualities that guide this knowledge into correct use (i.e. self-control and perseverance). Intellectual virtues aid in the correct use of knowledge towards good and proper goals.

An education that cultivates intellectual virtues augments and is strengthened by the eco-justice education described in the previous chapter. Intellectual virtues are a form of creation care that enable people to think critically about their environmental practices and act in an ecologically sustainable way. Creation care, in turn, provides the environment for students to develop traits such as intellectual attentiveness and intellectual curiosity as they explore and admire the natural world. This, in turn, reveals more about God's character to the students and serves as further motivation for students to properly steward the earth.

If we take care of our minds as a part of creation care, we ought to know what good intellectual character looks like. For the following sections we will explore intellectual character and intellectual virtues. We will then examine schools that use virtuous education pedagogy and connect this with garden-based education.

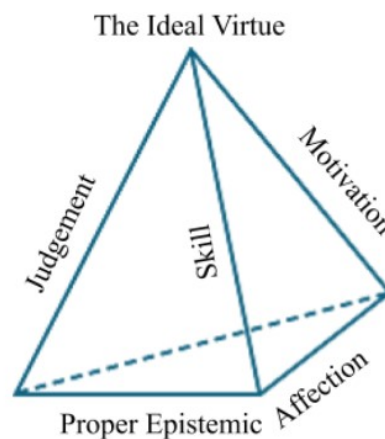
What is intellectual character?

Much of educational virtue theory has centered on moral, civic, and performance character. Successfully defining and developing many aspects of a student's life, these qualities focus on students' interactions with each other, within their community, and the underlying work ethic that drives it all. Yet, these virtues noticeably lack attention towards a crucial part of students' lives: Their minds. In his essay *Cultivating Good Minds*, Jason Baehr proposes intellectual character as an additional dimension to traditional educational virtue theory. With a focus on developing the mind, intellectual character cultivates virtues that lead to curiosity, open-mindedness, intellectual courage and intellectual honesty, critical thinking, and life-long learning.

Though distinct in its focus on the mind, intellectual character overlaps with and influences moral, civic, and performance character. The intellectual virtue of being open-minded, for example, greatly enhances the classic civic virtue of being a good neighbor. Having an open-mind allows space to not only learn about diversity but come to celebrate the differences that compose a community and, therefore, be a better neighbor. Similarly, the difficult process of cultivating intellectual virtues enhances the grit crucial in performance character while the qualities of a critical thinker inform and reinforce moral character. Intellectual virtues distinguish between Ritchhart's "Static Intelligence Versus Intelligence in Action" (Ritchhart 16). It is not enough to have knowledge but to have the wisdom that guides the use and application of this knowledge in real-world scenarios towards virtuous actions. In this way, intellectual virtues engage important processes of thinking that can be transferred to many areas of life outside of the classroom

Intellectual virtues influence what Ritchhart calls “thinking dispositions.” He defines thinking dispositions as “characteristics that animate, motivate, and direct our abilities towards good and productive thinking and are recognized in the patterns of our frequently exhibited, voluntary behavior.” (Ritchhart 21). Rather than accumulating facts to regurgitate on a test, educating for thinking dispositions focuses on cultivating transferable skills such as open-mindedness, curiosity, autonomy, and others that lead to learners, good thinkers, and, importantly to Urban REAP, good neighbors.

According to Ritchhart, learning dispositions must include not only knowing what the dispositions are, but also the desire, will, and ability to develop these traits. Baehr’s four-dimension model of intellectual character captures these traits while also delineating specific actions to develop virtuous thought. The arms of his model include the skill, motivation, judgement, and proper epistemic affection of intellectual virtues (Baehr 19). Here, each dimension is an arm of the pyramid that points to an ideal version of the virtue.



The four components of a virtue:
Judgement, motivation, skill, and proper epistemic affection

The skill of a virtue: This is the unique application of each virtue. A student may demonstrate the skill of intellectual honesty if she admits to plagiarizing a paper and the skill of intellectual curiosity if she asks insightful questions about a concept presented in the garden.

The motivation of a virtue: This describes both the desire to use the skills of a virtue as well as the desire to pursue further growth in the virtues. It is not enough to know what each virtue is or how it manifests in daily life but to possess the motivation to actively use each virtue.

The judgement of a virtue: This is the ability to know when and how much to exercise each virtue. Baehr cites conspiracy theorists as an example of poor judgment in using the virtue of open-mindedness. Though conspiracy theorists may have the motivation and skill to be open-minded, they practice this virtue in a detrimental capacity.

The proper epistemic affection of virtues: Expounding on the common goal of “life-long learning,” the proper epistemic affection of virtues is delighting in the learning process for the sake of learning rather than for its benefits. This delight manifests in both a desire and commitment to learn (Baehr 476). While the desire may spark the initial interest in pursuing knowledge, the commitment powers endurance for the difficult journey. A student must first desire to get out of the cave and persevere through the painful climb before he or she can see the light at the end of the pursuit. These qualities cultivate the “life-long learner” many schools aspire to create: A student who is intrinsically motivated

to learn for the sake of learning and sees the value and pleasure in the learning process itself.

If each arm of the intellectual character pyramid described above is the skill, motivation, and judgement of a virtue, then the base that binds these qualities together is the affection for virtue. Developing the affection of virtue compels growth in the three other qualities. A lover of truth will grow in the skills of intellectual virtues, be motivated to pursue virtue, and will learn the proper judgement of virtues all in pursuit of truth.

But what is *truth* and why should educators and students care about it? Although most people do not spend their time contemplating the truth of geometry, the habits formed by pursuing these academic truths translate into everyday practices.

Experimenting the efficacy of various fertilizers, for example, students may develop qualities such as intellectual tenacity, intellectual thoroughness, and intellectual attentiveness that propel the student to not only finish the long project but to do so meticulously and with attention to detail. These traits of intellectual tenacity and so on may start in the garden but translate into any work, relationship, or life experience. Thus, when educators invest in intellectual virtues in their students, they invest in an intellectually virtuous society to come.

The Need for Intellectual Virtues in Education

With teachers pressed for time in the classroom already, there must be good reason to incorporate intellectual virtues. The following section will discuss some criticisms of the current emphasis on standardized tests in our education system. To borrow George Ritzer's term, the "McDonaldization of education" and type of smartness

it leads to reveal the need for meaningful education focused on intellectual virtues (Ritzer 77).

What are we Testing for?

Written in post-Industrial society, *Hard Times* by Charles Dickens satirizes the education system and its emphasis on a utilitarian practicality (Greenfield and Nilsson 800). The intellectual headmaster Mr. Gradgrind orates,

“Now, what I want is Facts. Teach these boys and girls nothing but Facts. Facts alone are wanted in life. Plant nothing else, and root out everything else. You can only form the minds of reasoning animals upon Facts; nothing else will ever be of any service to them.”

The scene was a plain, bare, monotonous vault of a schoolroom, and the speaker’s square forefinger emphasized his observations by underscoring every sentence with a line on the schoolmaster’s sleeve.” (Dickens 2)

This comical scene becomes sobering when we look at many of the schools in the United States and realize eerie similarities between *Hard Times* and our times. A New York charter school teacher, for example, recalls about her teaching experience,

“This is not a school. It’s the military. The children are made to line up all day long. If one foot or hand is out of place, they get a punishment. They aren’t allowed to talk at lunch because the teachers say they get out of control. Their reading lessons are so boring. When I suggest an activity that might make reading more fun, my supervisor says there’s no time for that, that I must follow the plan already established. This is no place for kids. And it’s no place for people who really love teaching.” (Engel 40)

Suddenly, Dickens’ fictitious school in *Hard Times* does not seem far off from the reality of schools focused on order and increasing standardized test scores. In her book entitled, *The End of the Rainbow*, Susan Engel argues that our pursuit of money has shaped our education system and has culminated in schools that resemble those in *Hard Times* (Engel 41). She points out that research on the education system focuses more on

the types of jobs students receive after school instead of the types of people they become. Part of this reflects the difficulty in accurately researching and evaluating the “types of people” students become in comparison to the relative simplicity of analyzing their jobs, economic status, and other numeric quantities. Yet, this focus on research may reinforce the notion that success is defined by numeric quantities such as test scores and salaries.

Rather than being encouraged to explore their curiosity and learn for the joy of learning, students are often pushed to view each school as a necessary step to starting their “real-life,” a life where a well-paying job marks its success (Engel 7). To advance from each step within the school system, students must take standardized tests. With such high pressure surrounding standardized tests, it becomes easy for both students and teachers to view a high-test score as the immediate end goal.

This over-emphasis on tests and quantitative outcomes is exasperated in low-income and predominantly minority schools. Author and researcher Dr. Lisa Delpit describes how standardized education stifles teachers, inhibiting the creative and successful pedagogy that excites both teachers and students but is “not in line” with the state standards (Delpit 15). In low-income and minority schools, the focus becomes even narrower and blander that assumes “urban students can only achieve through repetition of small steps that require primarily rote answers and little or no critical thinking,” (Delpit 15). The McDonaldization of education leaves both teachers and students hungry for a more engaging and meaningful curriculum.

For students of any color, class, and creed, presenting the end goal of education as a high test score, a college acceptance, or even a well-paying job can minimize the inherent value of learning. For many students, aiming for a college acceptance seems like

an abstract and far-off goal while aiming for a high-test score seems meaningless outside the realm of school. For students who do not have the privilege of growing up in a home that values education or with parents who did not attend college, these goals may seem especially irrelevant. Even for students who aspire to attend college, learning becomes a means to an end rather than an enjoyable outcome in itself.

In response to students' disengagement from learning, Delpit presents the African understanding of education as a guide. In a worldview that believes every person can become god-like, the goal of education is to mold the body, mind, and spirit towards "correct" living to aid in a person's pursuit towards the divine (Delpit 16). For a teacher to appeal to the intellect, humanity, and spirituality of their students, the teacher must first understand the "inherent intellectual capability, humanity, physical capability, and spiritual character of students," (Delpit 16, Hilliard 102). Delpit goes on to write, "More often than not, the impediments to learning for Africans are expressed as character deficiencies rather than mental deficiencies. There is no doubt that all humans are *capable* of learning," (Delpit 116). The malleable character is the focus of African education rather than a static, inherent mental capacity our system hinges on (Ritchhart).

While Delpit calls for a shift in how we view students, Engel calls for a shift in our purpose of education. For her, the end goal is happiness. If we educate students for happiness and focus on their well-being rather than test scores, she poses, students may have a deeper love of learning and will approach the world through a lens of learning, curiosity, and joy. By shifting the importance from *what* students learn to *who* they become, education becomes more meaningful for both teachers and students and would result in an improved society. The qualities Engel emphasizes in educating for happiness

are reading, inquiry, flexible thinking, and use of evidence, conversation, collaborations, engagement, and well-being. These metrics "directly assess the capacities that actually matter in life outside of the testing room," (Engel 196). Educating for happiness, according to Engel, would result in a curriculum that focuses on the broad strokes of character development that translate directly into life beyond school.

These two arguments of education reform share an underlying theme of character development and call for a paradigm shift of how we view students and education, especially that of lower-income and minority populations. Using author David Brooks' (2015) words, these reforms call for eulogy virtues rather than resume virtues. At the end of life, our eulogy virtues define us- Were we loving, generous, encouraging? Yet, along the way, our resume virtues consume us- What skill can I contribute to my job? How can I move up the ladder? Brooks echoes Delpit and Engel when he writes,

We all know that the eulogy virtues are more important than the résumé ones. But our culture and our educational systems spend more time teaching the skills and strategies you need for career success than the qualities you need to radiate that sort of inner light. Many of us are clearer on how to build an external career than on how to build inner character. (Brooks 2015)

These perspectives call for a radical shift in today's education system and likely would support a coup of the Common Core Standards in favor of more flexible, holistic goals. Revolutionizing the education system may not be likely in the short term (and may not be necessary) but these arguments reveal the need for more meaningful education; meaning that has a purpose outside of the four walls of a testing center and turns on the "inner light" Brooks was searching for.

With no radical change of the education system in sight, garden-based education provides an especially relevant and feasible goal in transforming education into whole-person development. With an intentional curriculum that integrates the eco-justice and intellectual virtues discussed earlier, garden-based education incorporates academic standards in a meaningful context for both students and teachers. At Urban REAP, where the personal development of people is paramount, there is fertile soil for a garden-based education program that cultivates creation care and intellectual virtues through meaningful education.

Educating for Virtue

What would it take to develop an inner light? In pursuit of a meaningful education, we turn to intellectual virtues. Rather than focusing solely on *what* students learn, we can focus on *how* they learn to develop virtuous thinkers and, in turn, virtuous people. Engel called for happy students and, according to Aristotle, this is the same as calling for virtuous students. The philosopher writes, “Happiness turns out to be an activity of the soul in accordance with virtue” (Nicomachean Ethics). Perhaps we can raise students who are happy because they have been given the tools to think virtuously.

This proposal encourages the shift from IQ to IC, intelligence quotient to intellectual character. Rather than measuring a set of skills, such as speed and ability in learning, with IQ, IC stresses the importance of intellectual dispositions that contribute to a characterological conception of intelligence (Ritchhart 1). Having a characterological concept of intelligence expands our standard of smartness from performance on a certain type of test to a dynamic and fluid model that captures students’ ways of thinking.

While test scores and IQ serve as quality predictors of future performance on similar tests, they do little to predict how a person will act in a real-world situation. Research suggests that intellectual character is a better indicator of future workplace success than IQ (Ritchhart 4). In extension, IC does not only influence performance in the workplace but also how people relate to their community and make sense of the world. An intellectually open-minded person is likely to be more accepting of their neighbor from a different background while an intellectually humble person is willing to admit what they do not know and learn from others.

To prepare students for virtuous actions in real-world situations, education can focus on developing the thinking dispositions related to IC. By refining thinking dispositions, teachers can help their students develop logical and meaningful thought patterns that can positively influence the way students interact and work in society.

Using the definitions of intellectual virtues described earlier, we will examine different schools that have based their pedagogy on intellectual virtue education. In doing so, we will elucidate the connection between educating for happiness and intellectual virtues and outline practical guidelines in carrying out this endeavor in the classroom.

Intellectual Virtues Academy | Long Beach, CA

Since 2013, Intellectual Virtues Academy (IVA) has been dedicated to providing rigorous academic education for middle school students. Their mission and vision statements are:

MISSION: to foster meaningful growth in intellectual character virtues in a thoughtful, challenging, and supportive academic environment.

VISION: to equip students to engage the world with curiosity and thoughtfulness, to know themselves, and to live well.

Though their pedagogy centers on intellectual virtues, they maintain the Common Core State Standards through their virtuous pedagogy and demonstrate test scores above the national average.

CAASPP STATE TEST - SMARTER BALANCED ASSESSMENT			
% of Students who Met or Exceeded Grade Level Standards			
	IVA	Local (LBUSD)	State (CA)
English Language Arts 2018-19	77%	53%	50%
English Language Arts 2017-18	75%	45%	48%
English Language Arts 2016-17	71%	48%	49%
English Language Arts 2015-16	69%	45%	48%
English Language Arts 2014-15	73%	44%	42%
 Mathematics 2018-19	 59%	 44%	 38%
Mathematics 2017-18	61%	34%	35%
Mathematics 2016-17	58%	39%	38%
Mathematics 2015-16	51%	36%	34%
Mathematics 2014-15	59%	33%	32%

Test scores on standardized California Assessment of Student Performance and Progress for students at IVA.

Their emphasis on intellectual virtues does not change the content of IVA classes so much as affect the way teachers approach each subject. Every lesson plan, assignment, and classroom setting strives to uphold the school's mission and vision by promoting

critical thinking, deep understanding, and discussion influenced by intellectual virtues. Some of their fundamental principles in promoting intellectual virtues include (adapted from Baehr 2013):

1. *Supportive campus involvement.* Having an entire school on-board with virtuous education greatly helps develop students who know about and act with intellectual virtues. Teachers have limited time with their students each day and, especially in middle and high school, students experience a myriad of influences that affect their behavior. If students constantly hear and see intellectual virtue language on their campus, they are more likely to internalize these concepts and hold on to them.
2. *Direct Instruction.* Teachers and school administration speak explicitly about intellectual virtues. By defining intellectual virtues and what they look like in action, teachers give students a concrete concept to apply and recognize in their lives. Although knowing about intellectual virtues does not necessitate that a student will act virtuously, it is an important step in their journey to an intellectually virtuous life.
3. *Self-reflection and self-assessment.* Giving students opportunities to reflect on their understanding and practice of intellectual virtues reinforces the direct instruction and challenges them to consider times they have embodied some of the intellectual virtues.
4. *Explicit connections between the course curriculum and intellectual virtues and vices.* This method can manifest in two ways. Firstly, teachers can draw out the virtues or vices displayed in their curriculum, such as a scientist who displayed

intellectual tenacity or a literary character who displayed intellectual arrogance. Additionally, teachers may emphasize certain virtues that will aid in students learning and understanding the material. A particularly difficult science lesson or research paper may need intellectual perseverance. Or reading a book from another culture or faith tradition may require intellectual humility. In both of these circumstances, the teachers use the curriculum as a baseboard for drawing out intellectual virtues.

5. *Frequent opportunities to practice the actions of intellectual virtues.* By incorporating activities that challenge students to act intellectually virtuous (such as having the students develop questions (intellectual curiosity), argue from a different view-point (intellectual open-mindedness), and so on, teachers aid in their students' understanding of intellectual virtues. Students not only grow stronger in their "intellectual virtue muscles" but also see relevant circumstances where they can apply the virtues.
6. *Integrating virtue concepts into formal and informal assessments.* Giving students feedback on their performance of intellectual virtues allows them to understand how these traits manifest in daily life and also provides further motivation to develop these skills. Informal assessment may include feedback during class that highlights particularly virtuous behavior ("That was very open-minded of you!" "I appreciate the intellectual humility you had in that statement.")). Formal assessment takes place in grading assignments and creating rubrics (i.e. creating rubrics with sections that demonstrate skills of intellectual virtues such as "careful attention to detail," "asked thoughtful questions," etc.).

7. *Modeling intellectual virtues.* When the instructors espouse intellectual virtues in both their words and actions, students have a model to follow that reveals how to apply virtues in daily life. Further, teachers who set the standard of humility by admitting mistakes and moving forward with a positive mindset foster a culture of “growth” rather than “stagnant” intelligence. Students will realize the lifelong journey of growth in intellectual virtues and will accept failure not as an end but as a means of growth.

By creating an environment that fosters intellectual virtues, IVA allows teachers to incorporate virtue education in their regular instruction and have a meaningful impact on the students’ development because of the continuity of virtue education in the school. Baehr states, in his essay *Educating for Intellectual Virtues: From Theory to Practice*, that this approach will likely not make “paragons of intellectual virtues” after a few semesters in this instruction. However, it may spur students onto meaningful progress in growing in intellectual virtue and give them the tools necessary to continue this journey after school (Baehr 259).

Aspiring to cultivate intellectual virtues represents a paradigm shift in the way many people approach education and is certainly opposed to the school seen in *Hard Times*. The focus must shift from concrete, numerical outcomes to less visible, interior characteristics of development. We must ask: what is the goal of education? According to Aristotle, the greatest good is to be happy in accordance with virtue. Educating for intellectual virtues aligns with this goal and seems to produce students who not only have a deeper understanding of the material but more excitement and interest in learning.

Further, far from impractical in the daily setting, intellectual virtue education may prepare students for the workforce more than the traditional curriculum approach.

Employers at Google researched the traits of their most successful employees and discovered that the characteristics that predicted success best were soft skills, such as “being a good coach; communicating and listening well; possessing insights into others (including others different values and points of view); having empathy toward and being supportive of one’s colleagues; being a good critical thinker and problem solver; and being able to make connections across complex ideas” (Strauss). Other sources cite the six C’s as key characteristics to success: collaboration, communication, critical thinking, creativity, content, and confidence (Battelle for Kids, Becoming Brilliant).

The model of virtue education established by IVA provides clear guidelines for how to implement this pedagogy. They have divided nine intellectual virtues into three successive categories (Getting Started, Executing Well, and Handling Challenges). Within each category, they define the virtue and have a short slogan that quickly reminds students about the skill associated with the virtue. The outline from their website is:

Getting Started

1. *Intellectual curiosity*: a disposition to wonder, ponder, and ask why. A thirst for understanding and a desire to explore. Slogan: Ask questions!
2. *Intellectual humility*: a willingness to own up to one’s intellectual limitations and mistakes. Unconcerned with intellectual status or prestige. Slogan: Admit what you don't know!
3. *Intellectual autonomy*: a capacity for active, self-directed thinking. An ability to think and reason for oneself. Slogan: Think for yourself!

Executing Well

4. *Intellectual attentiveness*: a readiness to be “personally present” in the learning process. Keeps distractions at bay. Strives to be mindful and engaged. Slogan: Look and listen!

5. *Intellectual carefulness*: a disposition to notice and avoid intellectual pitfalls and mistakes. Strives for accuracy. Slogan: Avoid errors!

6. *Intellectual thoroughness*: a disposition to seek and provide explanations. Unsatisfied with mere appearances or easy answers. Probes for deeper meaning and understanding. Slogan: Go deep!

Handling Challenges

7. *Intellectual open-mindedness*: an ability to think outside the box. Gives a fair and honest hearing to competing perspectives. Slogan: Think outside the box!

8. *Intellectual courage*: a readiness to persist in thinking or communicating in the face of fear, including fear of embarrassment or failure. Slogan: Take risks!

9. *Intellectual tenacity*: a willingness to embrace intellectual challenge and struggle. Keeps its “eyes on the prize” and doesn’t give up. Slogan: Embrace struggle!

The well-oiled IVA has a systematic and effective method of infusing intellectual virtues in everyday education. But, what are the students, parents, and educators saying about this? As Engel pointed out, high test scores pale in comparison to the importance of students becoming virtuous and happy people. The high test scores demonstrated at IVA should be compared to the personal outcomes of students engaging in intellectually

virtuous education. We will now consider how parents, educators, and students describe their experience at IVA.

According to a mid-year survey sent out to every student in the 2016-2017 year, the results were overwhelmingly in favor of students feeling cared for, challenged, and prepared for success in their schools.

Questions	IVA % Responding Agree and Strongly Agree
The school provides high quality instruction.	96%
The school has high expectations for all students.	85%
The school provides me with academic resources and support.	96%
I practice intellectual autonomy by taking advantage of academic resources.	92%
Class content and teachers encourage students to become aware of and seek to understand diverse ideas and culture.	95%

Questions	IVA % Responding Agree and Strongly Agree
Class content and teachers encourage students to become aware of and seek to understand diverse ideas and culture.	95%
The school provides social and emotional support for me (Ex: I feel like I can talk to an adult when I have a concern).	78%
I am cared for by at least one adult at IVA (teacher, staff, advisor).	91%
I feel safe at this school.	91%

Questions	IVA % Responding Agree and Strongly Agree
Overall, and so far, I am satisfied with my education at IVA.	93%

Survey responses from students at Intellectual Virtues Academy in the 2016-2017 school year.

Additionally, feedback from students and parents gives life and meaning to these statistics:

“IVA, I believe from my experience does well at making everyone comfortable and have confidence when admitting when you need help or when you don't understand. They also build up your confidence. Before I came to IVA I would never raise my hand because I was scared but now I don't care.” -Student

“I think that IVA is great at providing students with learning opportunities and having the kids learn with a deeper understanding rather than shoving facts down kids' throats and forcing them to regurgitate it onto a test paper.” -Student

“The kid that comes home loving and talking about math, the kid that was so touched by the Holocaust she did her own research, the kid that came home so stoked to do her Science project, she hyper-focused on it for two days straight to finish it a month early. The kid that feels loved and nurtured and understood. These to me are so priceless. She loves the students, all of her teachers and all of her classes.” -Parent

“I was really drawn to IVA because of the unique way that it addresses learning within the students: it gives a realistic approach to teaching students holistically. I appreciate that the emphasis is on personal growth within the students, focusing on their process, rather than their outcome.” -Teacher

“Never a day goes by, here, that I don't laugh with students, have an opportunity to learn something from them, and become a better thinker. This is a wonderful place not just for students, but for the adults who work so hard right alongside them, in becoming deeper thinkers and improving themselves each day.” -Teacher

“I had all but lost my passion for teaching and education until I explored IVA's website. Upon reading their Mission, Vision and Intellectual Virtues, I felt an energy and excitement for education once again. IVA's approach to learning encompasses who students are, how they think, learn, and experience growth, instead of what they know. I was inspired by IVA's teaching model and the culture of thinking that is desired, encouraged and supported. I appreciate that IVA not only focuses on character growth for their students, but for their staff and community as well.” -Administrative Assistant

These are individual anecdotes but likely represent the overarching culture found at IVA- a culture that engages students with meaningful learning in a supportive community of teachers and peers. Intellectual virtues are the basis for a promising pedagogy. By reframing mathematics lessons as life lessons under the context of intellectual tenacity, carefulness, and so on, teachers can infuse greater meaning in their classrooms and educate beyond the test.

Intellectual Virtues and Creation Care

We have already discussed intellectual virtues as a form of creation care but now, after exploring what intellectual virtues are and the need for them in education, we will examine specific intellectual virtues in relation to garden education and creation care.

Though each intellectual virtue helps encourage creation care, some intellectual virtues may be more foundational in preparing someone to care for the earth. For the following paragraphs, we will discuss the value of four intellectual virtues regarding creation care: Intellectual attentiveness, intellectual curiosity, intellectual courage, and intellectual open-mindedness.

Intellectual Attentiveness

*Be praised, my Lord, through all your creatures,
especially through my lord Brother Sun,
who brings the day; and you give light through him.
And he is beautiful and radiant in all his splendor!
Of you, Most High, he bears the likeness.*

Canticle of the Sun, St. Francis of Assisi

To care for something, we must first know it. The same is true with creation- Research shows that people who have had positive interactions with the environment as youth have more care and responsibility for the earth as adults. But how do we get to know creation? We can look to one of the greatest exemplars of creation care, St. Francis of Assisi. The Patron Saint of Animals wrote the Canticle of Brother Sun, writing himself into the integrated family of creation and praising God for specific attributes of each family member. Ironically, St. Francis wrote this canticle soon after he lost his sight. Yet, because of his years spent in communion with nature, St. Francis envisioned creation

with better clarity than sighted people and had a deep respect for the world that stemmed from his knowledge of it.

To begin transforming our minds to value creation independent of its use to humans, we need to start with recognizing the beauty of creation and its place independent of us. Knowledge begets love and, in turn, care (Bouma-Prediger 149). As Bouma-Prediger notes, the opposite of love is apathy (Bouma-Prediger 149). Without noticing the world around us, we cannot form the familial relationship St. Francis shared with creation. The foundational intellectual virtue, especially for students, must be intellectual attentiveness. Students who may have had limited time in nature must start with a recognition and appreciation of nature. Further, for students who may struggle with food insecurity or other hardships, focusing on nature may be beneficial to recenter and see the beauty of the world around them.

Intellectual Curiosity

*It is the marriage of the soul with nature that makes the intellect fruitful,
and gives birth to imagination.*

Henry David Thoreau

A natural response to attentiveness is curiosity. When we notice the world around us, we begin to ask the *whys*, *hows*, and *whos* of nature. As Thoreau illustrates, our attentiveness to the world naturally kindles a flame of imagination and curiosity that learning does not satisfy but, rather, ignites.

One of the greatest benefits of curiosity may be its ability to intrinsically motivate students and propel them toward a love and interest in learning (Baehr 60). When given the freedom to explore the world around them, students have the opportunity for organic

questions to bubble up in their mind and burst into the excitement of learning and discovery as they pursue the answer. For students who have felt disengaged in class, especially STEM courses, curiosity can spark a renewed desire to pursue questions and learn.

Intellectual Courage

We have lived our lives by the assumption that what was good for us would be good for the world. We have been wrong. We must change our lives so that it will be possible to live by the contrary assumption, that what is good for the world will be good for us. And that requires that we make the effort to know the world and learn what is good for it.

Wendell Berry, The Long Legged House (1966)

Radically changing one's world view from an anthropocentric to theocentric view and cultivating an ethic of responsibility necessitates intellectual courage. It takes resolve to make decisions that are not convenient or popular; decisions such as reducing the use of disposable products, walking rather than driving when possible, and buying responsibly sourced items. Further, it takes intellectual courage for students to share their potentially unpopular opinions with their peers.

Despite students' interest in being intellectually courageous, many educators find it difficult to develop this trait. Baehr notes that developing intellectual courage requires a supportive environment where students feel comfortable sharing their ideas and risk being wrong (Baehr 142). School gardens, where strengths other than traditional classroom skills are valued, offer an equalizing platform that lends into a supportive environment. Further, if learning about creation care leads to revolutionary thinking such as students questioning their sustainability practices and role in the environment, the garden allows students to take risks with the support of a community. If they feel secure

in their class, they will be able to share their new ideas and build off each other as each one learns his or her role in caring for creation.

Intellectual Open-Mindedness

The Earth is what we all have in common.

Wendell Berry

On the foundation of intellectual attentiveness, curiosity, and courage, we now come to intellectual open-mindedness. In an increasingly diverse and globalized world, the need for open-mindedness is critical. As discussed in the first chapter, garden education offers students an opportunity to learn about their place as global citizens. In this context, students can practice intellectual open-mindedness as they learn about other cultures, try new things, and change their perception of creation. Further, since one of the most highly researched personal outcomes of garden education is teamwork, intellectual open-mindedness is especially beneficial in helping students learn from each other and collaborate.

CHAPTER FOUR

Growing a Garden

The Earth is what we all have in common.

Wendell Berry, *The Body and the Earth*

Though we just examined this quote in terms of intellectual virtues, we now consider it while thinking about Waco. Amidst the diversity and disparity in Waco, there is a unifying feature of place. And place, as Thoreau shows us in *Walden*, is a powerful force. Thoreau's unity between personhood, pedagogy, and place reveals the connections between our commitment to creation care, learning through nature, and developing intellectual virtues.

How can we make these connections tangible in Urban REAP through garden-based education? The first step should be to (re)connect students with their place. By inviting teachers and students into the garden and sparking their curiosity about the natural world, students can discover the beauty and joys of creation. With an intentional pedagogy, teachers can explore with students the important role they have in the web of creation and develop an ethic of responsibility. Dr. Veronica Gaylie, a professor at the University of British Columbia Okanagan, found that educating teachers in the garden led to discussions and realizations of “direct food, globalization, and anthropocentric learning models,” (Gaylie). Further, it led to being in a “constant state of environmental and community activism.” Gaylie's experience with educating teachers can be translated into educating grade-school students. Connecting students with their place must begin with time spent in the outdoors and should be reinforced by meaningful conversations and pedagogy that connects people's actions with the effect on the environment. Though it

may start in small ways or simply plant a seed for future growth, garden-based education can provide new resources for teachers to facilitate changes in a students' personhood as well as by cultivating virtue.

Future Steps

Steps in implementing a garden-based education program at Urban REAP will include: Working with Urban REAP, schools, and the community to define goals and to curate curricula and activities for the garden. Each step in the process should invite community members, educators, school administrators, students, or parents. In doing so, the individual characteristics and values of the community will be reflected in Urban REAP. Inviting others into the process also promotes buy-in that is crucial for a flourishing garden-based education program. The success of Jubilee Market benefits from community input and exemplifies the power of a community (specifically, this community) that is united in a goal (Saegert).

In a recent interview, the Urban REAP director Dan Hiatt shared that the community garden is still establishing its identity in Waco (Hiatt). As of May 2020, Urban REAP has hosted local schools for field-trips, offered continuing education courses for McLennan Community College, and led composting classes to encourage neighborhood involvement in eco-centered practices. According to Hiatt, Urban REAP is interested in developing a more robust garden-based education program to connect with local schools. Moreover, Urban REAP would like to offer resources teachers can bring back into their classrooms to continue the garden-based education they began at Urban REAP. With its budding garden and aquaponics system, Urban REAP is ripe for

connecting with local schools and empowering teachers to include more hands-on and personally enriching lessons.

Though every community member is important in ensuring a successful garden program, teachers are especially vital in starting and maintaining the connection between Urban REAP and schools. The following section will offer a process to engage teachers and other stakeholders and various resources for teachers.

Teacher Buy-in & Support

With teachers already pressed for time in the classroom, having an additional expectation of creating garden-based lesson plans, learning about gardening, or rallying excitement in their students may seem daunting or unfeasible. Teacher endorsement, support, and enthusiasm, however, is critical for a successful school garden program (Burt et al. 1546, Hart et al. 475).

To engage teachers, we suggest an online meeting with a virtual tour or in-person meeting at Urban REAP to share the opportunity of supporting their work with a range of activities that align with TEKS. The goal of this meeting is to present ways Urban REAP can provide new learning opportunities, solicit others in the community, share available resources, gain support to expand the Urban REAP programming, and brainstorm ideas for next steps to work with a few elementary school teachers and administrators at local schools. These ideas will be refined and developed into a plan for review by the first cohort of participating teachers and their administrators.

Thankfully, many resources are available for educators as they plan activities and goals for the garden. Riverbend Environmental Center and leaders like Michael Barcus

and Erin Cool are bringing aquaponics and related programming to teachers in Pennsylvania. Urban REAP can learn from them to develop their program and engage their community (Barcus). The following section hopes to curate a toolkit of financial and curricular resources that educators can utilize as they explore garden-education. Full citations of each resource are found at the end of this chapter.

Creative Fundraising and Community Building Ideas

If teacher support is the most important criterion for successfully expanding Urban REAP's garden programming, ample funds and community buy-in are close seconds. Especially since Urban REAP is a part of the community and is not tied to a specific school, raising community interest is crucial to a flourishing garden-education program. Though Urban REAP does not need funds for building a garden or aquaponics system, it may need further financial support if it wishes to expand a garden-based education program by enriching their field-trips, developing classroom lesson plans, offering teacher and parent workshops, partnering with local businesses to provide home gardens and garden challenges. Community meetings will be recommended to gather additional community feedback. University partners such as Baylor's School of Education, School of Social Work, School of Business, School of Engineering, Truett Seminary, and the Department of Environmental Science can be engaged, particularly gardening courses taught each semester by Professor Doug Nesmith and Dr. Stephanie Boddie's Education from a Gardener's Perspective course. These partnerships will be established to support the development of curriculum and program assessment as well as supply volunteers and technical support. Further, this presents a wonderful opportunity

for Baylor students to become more involved with Urban REAP and become invested in the community.

Further, churches can be a great source of community involvement as both sources of volunteers, financial or community support, and as partners with the garden. Churches may even work with Urban REAP to provide summer Vacation Bible School programs for youth. These programs could similarly carry out Urban REAP's goal of creation care as an integral part of the Christian life.

In its manual for starting garden programs, the Collective School Garden Network (CSGN) outlined grants, donations, and fundraising as the top three ways schools raise the financial support to start garden programs ("Curriculum Database" 50). Though grants may not exude community building, the latter two options can be a community effort that increases buy-in while achieving financial and community goals that ensure success.

For donations, community members may wish to donate items, creative skills, or gardening expertise to the program rather than monetary donations. Especially in a community where discretionary money is not an option, community members can feel a sense of ownership or pride in donating other goods to the garden. Further, for community members who enjoy gardening, offering expertise in gardening may benefit members' emotional health and give them a chance to continue enjoyable hobbies.

Similarly, fundraising can double as support-raising. Creative fundraising ideas from CSGN include: Selling vegetables raised in the garden; making salsa, jams, or other goods with garden ingredients; and holding a silent auction in the garden that includes a garden tour, dinner, or another event. All of these ideas either invite people into the

garden or offer them produce grown in the garden. These options help community members see the fruit of their investment and can rally buy-in. Further, if the fundraising events include students in the process, the fundraising can promote student excitement for the garden and, in turn, for garden education.

There are endless ideas for fundraising but this is a beginning list that raises funds while raising community, school, and student buy-in.

Curriculum Resources

The following table outlines a variety of garden and aquaponics education resources. Some resources offer free curricula for download while others offer books of lesson plans for purchase. The Edible Schoolyard (ESY) has a detailed explanation of their curriculum-making process on their website (“Curriculum Overview” 14-18). Similarly, the Collective School Garden Network (CSGN) shares ideas of connecting garden-education to standards-based learning objectives (“Gardens for Learning” 20-29). These may be additional helpful resources as educators think through the logistics of garden and aquaponics education.

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Resources for garden-based curriculum.

Name and Location	Description of Program	Curriculum? Grades/Subjects	Free Curriculum?
The Edible Schoolyard Berkeley, CA	Since 1995, ESY has used “food to engage all aspects of the child’s education” and provide students with healthy lunches at school.	Yes. ESY curriculum for grades 6-8/primarily science. Also offers curricula for PreK-5th from their partners on their website. Additionally has a free resource book for teachers.	Yes. Also offers summer trainings at ESY that are not free.
Life Labs Santa Cruz, CA	Life Labs began their first school garden in 1979 and now have a national impact through teacher and school consultations, trainings, and garden support.	Yes. K-5/science. <i>*Curriculum based on California State Standards.</i>	Limited free downloads from their website. Also offers extensive curriculum guides for purchase.
Junior Master Gardeners College Station, TX	JMG is a program any classroom can participate in. JMG offers their own curriculum and activities so students can become a Junior Master Gardener.	Yes. K-8th/interdisciplinary. <i>*Connects curriculum with multiple state standards, including TEKS.</i>	Limited free downloads from their website. Activity and lesson guides available for purchase.
AgriCorps Throckmorton, TX	Equips Americans to bring “experiential, school-based agricultural education in developing countries.”	Yes. Offers curricula and resources for teachers.	Yes.
OutTeach Ft. Worth, TX	OutTeach is a “national teacher-development nonprofit” that aims to provide every student with engaging and transformative education.	Yes. Development programs work with teachers to create engaging and standards-based lesson plans.	No.

Collective School Garden Network CA AZ	“The Foundation’s mission is to plant and sustain a fruit and vegetable garden in every willing Arizona and California school.”	Yes. Offers curricula and resources for teachers.	Yes.
The Aquaponics Source	This organization provides aquaponics curricula that connects STEM disciplines with economics, nutrition, and other subjects	Yes. 3-12/interdisciplinary.	No. Books are for sale on their website.
National Agriculture in the Classroom	This resource contextualizes Common Core Standards into garden and aquaponics lesson plans	Yes. K-12/interdisciplinary.	Yes.
Riverbend Environmental Center	This organization provides aquaponics technical support and curricula that connects STEM disciplines with economics, nutrition, and other subjects	Yes. K-12/interdisciplinary	Contact REC for information

Beyond the Curriculum

Though the curriculum is integral to the success of garden-education, the Edible Schoolyard (ESY) reminds us of the significance of the culture built in the garden. As discussed in the previous two chapters, garden-education is such a powerful tool because of its widespread effects including transforming culture. It not only engages students in academic learning but it also promotes personal growth through creation care and virtues and builds community in the classroom. Building an intentional culture in the garden may be just as important as planning an intentional curriculum.

The Edible Schoolyard (ESY) provides an in-depth discussion of their journey in building an encouraging community in their garden in their “Curriculum Overview.” Much of their philosophy stems from teachers empowering students to explore and take healthy risks in their garden experience. By giving students opportunities to experiment with their recipes, lead their peers, and have ownership over their ideas and actions, teachers can promote much personal growth in their students.

Together with an intentional culture in the garden, thoughtful instruction is important in developing a garden that raises children in addition to raising test scores. The past two chapters focused on creation care and, as a subset, intellectual virtues. Though these qualities can be cultivated innately through gardening, it will be more effective to use explicit language of these goals. Encouraging students to use their “intellectual attentiveness” to explore the garden like scientists and record observations can feed into their love of creation and, with guidance, into an ethic of responsibility for creation. The above curriculum ideas do not target intellectual virtues or creation care directly but can be easily modified to do so. This work creates opportunities to develop new curriculum.

As an example of an intentional curriculum that could be used in the garden, we examine the following lesson plan adapted from Life Lab. With intentional connections to creation care and opportunities to practice intellectual virtues, this activity can easily be modified to promote Urban REAP's mission.

Garden Habitats- Life Lab Science Program

In this lesson, “students will learn to observe closely and ask questions. They will learn about the direct relationship between essential resources, such as water, food and

shelter, and the population of animal species. Students will examine different microhabitats and observe the plant and animal interactions. They will learn about the benefits of a diverse habitat in the garden,” (Life Lab Science Program 2009)

Opening Question: What do we need to live? Where do we get these resources? What is a habitat?

Activity: Students will explore the garden to find different aspects of plant and animal habitats that help each organism live. They will share their findings with the class. Students also play a game to demonstrate the effect of habitat loss on living creatures.

Connection to Creation Care: This activity demonstrates the importance of every part of the environment in sustaining life. Further, the habitat game reveals the impact humans can have on the environment and can lead to a discussion of being good stewards of the earth.

Connection to Intellectual Virtues: Intellectual attentiveness (paying close attention to every part of the environment, both living and nonliving); Intellectual open-mindedness (realizing the impact of humans’ actions on the environment); Intellectual humility (learning healthy every-day habits that protect the environment)

Connection to Urban REAP: This lesson could be adapted to observing the aquaponics habitat and how that is similar and different from fish and plants’ usual habitat. Further Urban REAP may share its composting, solar panels, or other commitments to healthy environmental living and encourage students to be good stewards of the earth.

Targeted TEKS: The above lesson can be adapted to target English language arts and reading TEKS in addition to science TEKS. Life Lab has a list of suggested reading that corresponds to this lesson. Further, students may have a creative writing project that asks them to tell the story of an organism living in a certain habitat.

	Science	English Language Arts and Reading
Second Grade	b.9.A-C Identify the basic needs of plants and animals; Identify factors in the environment, including temperature and precipitation, that affect growth and behavior such as migration, hibernation, and dormancy of living things; and Compare the ways living organisms depend on each other and on their environment, such as through food chains.	b.10.A discuss the author's purpose for writing text b.12.A-B dictate or compose literary texts, including personal narratives and poetry; Dictate or compose informational texts, including procedural texts
Third Grade	b.9.A-C observe and describe the physical characteristics of environments and how they support populations and communities of plants and animals within an ecosystem; Identify and describe the flow of energy in a food chain and predict how changes in a food chain affect the ecosystem such as removal of frogs from a pond or bees from a field; and Describe environmental changes such as floods and droughts where some organisms thrive and others perish or move to new locations.	b.10.A Discuss the author's purpose for writing text b.12.A-B Compose literary texts, including personal narratives and poetry; Compose informational texts, including procedural texts and reports;

Final Reflections

*“Telling a story is like reaching into a granary full of wheat and drawing out a handful.
There is always more to tell than can be told.”*

— Wendell Berry, Jayber Crow

Both garden-based education and Waco, TX, have a history of victories and defeats; results of many different stories and influences that are “more to tell than can be told.” At this moment, their stories have intersected in a unique way in the unique place of Urban REAP. This neighborhood in north Waco has historically been disinvested in but, in recent years, many seeds of hope are sprouting in the cracks. As one of these seeds, Urban REAP is on the trajectory of continued growth and impact with the community. By partnering with local schools and providing garden education especially those including aquaponics, Urban REAP can impact the academic engagement, health, and environmental stewardship of youth. The story of these effects may also eventually be “more to tell than can be told.” No story will be told, however, if a new chapter is never begun.

APPENDIX

Curriculum Ideas

The following garden curriculum samples are based on the suggestions from ESY and LifeLabs outlined above. Below are summaries of the activities, targeted TEKS, connections with intellectual virtues and creation care, and suggestions for how to personalize each lesson to Urban REAP.

Pondering Plants- Life Lab Science Program

“In this unit, students will learn about the different resources that plants need (sun, soil, water, and air) and how the different plant parts capture those resources from the environment. They will explore plants from different environments and discuss why their roots, stems, and leaves look different” (Life Lab Science Program 2007).

Opening Question: What are examples of living things? Are plants living? Do they eat and grow like people do?

Activity: Students act as plant detectives in the garden to find and record as many plants as they can. They may draw their observations, carefully noting each part of the plant. Students will regroup and discuss the different parts of the plant (stem, roots, leaves) and how they play a role in nourishing the plant. To solidify their knowledge, students may paint and label some of the favorite plants they discovered in the garden.

Connection to Creation Care: Students will realize that plants are living things and

need care, similar to people. Leaders may discuss the importance of caring for plants by showing how delicate and vital they are to the world.

Connection to Intellectual Virtues: Intellectual attentiveness (acting as “plant detectives” and exploring the garden); Intellectual curiosity (asking how plants get their nourishment and grow, allowing time for students to ask questions).

Connection to Urban REAP: Students may learn how the aquaponics system is used to grow plants and how plants can receive nutrients without soil.

Targeted TEKS: Though this lesson primarily focuses on science learning objectives, additional activities can be added to target English language and mathematics goals. Examples include: Reading a storybook about plants before starting the activity; Counting the number of petals or leaves on each plant; Graphing the number of leaves found.

Further, the lesson can be extended for higher grades to include learning more about each part of the plant and learning about the relationship between plants and their environments.

	Science	Mathematics
Kindergarten	<p>b.10.A-D Sort plants and animals into groups based on physical characteristics such as color, size, body covering, or leaf shape; Identify basic parts of plants and animals; Identify ways that young plants resemble the parent plant; and Observe changes that are part of a simple life cycle of a plant: seed, seedling, plant, flower, and fruit</p>	<p>b.2.A-B Count forward and backward to at least 20 with and without objects; Read, write, and represent whole numbers from 0 to at least 20 with and without objects or pictures</p> <p>b.8.A-B Collect, sort, and organize data into two or three categories; Use data to create real-object and picture graphs</p>
First Grade	<p>b.9.A-C Sort and classify living and nonliving things based upon whether they have basic needs and produce offspring; Analyze and record examples of interdependence found in various situations such as terrariums and aquariums or pet and caregiver; and Gather evidence of interdependence among living organisms such as energy transfer through food chains or animals using plants for shelter.</p> <p>b.10.B Identify and compare the parts of plants</p>	<p>b.8.A-C Collect, sort, and organize data in up to three categories using models/representations such as tally marks or T-charts; Use data to create picture and bar-type graphs; and Draw conclusions and generate and answer questions using information from picture and bar-type graphs</p>
Second Grade	<p>b.10.A-C Identify the basic needs of plants and animals; Identify factors in the environment, including temperature and precipitation, that affect growth and behavior such as migration, hibernation, and dormancy of living things; and Compare the ways living organisms depend on each other and on their environments, such as through food chains</p>	<p>b.10.A-B Explain that the length of a bar in a bar graph or the number of pictures in a pictograph represents the number of data points for a given category; Organize a collection of data with up to four categories using pictographs and bar graphs with intervals of one or more</p>

Compost Lab- The Edible Schoolyard Project

In this activity, students activate all five senses as they learn about the compost cycle. This offers a great opportunity for students to make connections among different organisms/processes and match interdisciplinary TEKS. Further, Urban REAP's compost machine helps students see the compost process and understand its benefits.

Opening Question: The Mystery of the Apple. What's going on with this apple (or any other rotting fruit)? Briefly introduce decomposition.

Activity: Ask students to explore in the garden and try to find anything that may be related to the "mystery of the apple." Regroup and review decomposition. Relate compost to a layered cake, where each layer is a different source of carbon or nitrogen for the microorganisms. Discuss the role heat plays in making compost. Finish by having students feel the finished compost product.

Connection to Creation Care: This activity demonstrates the importance of every living organism. Even though we cannot see microorganisms, they play a pivotal role in the decomposition process. Leaders can ask questions such as, "What is the importance of microorganisms? What effect does destroying plants/other organisms have on this process?" to stimulate students' thinking about creation care.

Connection to Intellectual Virtues: Intellectual attentiveness (students explore the garden to discover what may be a part of the "mystery of the apple."); Intellectual

curiosity (introduce each topic by first asking questions to engage students' thinking. Offer opportunities for students to ask their own questions)

Connection to Urban REAP: Students can aid Urban REAP in a compost project.

Possible ideas may be: Use math skills to develop a “compost cake recipe” that balances each ingredient for good quality compost or using proportions to determine how much compost is needed per amount of soil in a potted plant. Students can then apply their findings in Urban REAP and help pot plants with compost.

Targeted TEKS: This lesson could be adapted for a variety of learning objectives and practical applications. In addition to the current science focus in the activity, the lesson can be modified to also target mathematics goals. Examples include: Representing observations in a graph; Writing an equation to model how much compost can be made in a certain amount of time; Using data to write an equation of the growth of a plant with and without compost.

	Science	Mathematics
Fifth Grade	<p>b.3.A-B Analyze, evaluate, and critique scientific explanations by using evidence, logical reasoning, and experimental and observational testing; Draw or develop a model that represents how something that cannot be seen such as the Sun, Earth, and Moon system and formation of sedimentary rock works or looks</p> <p>b.9.B Describe the flow of energy within a food web, including the roles of the Sun, producers, consumers, and decomposers</p>	<p>b.9.A-B Represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots;</p> <p>Represent discrete paired data on a scatter plot</p>
Seventh Grade	<p>b.5.A-B Recognize that radiant energy from the Sun is transformed into chemical energy through the process of photosynthesis; and</p> <p>Diagram the flow of energy through living systems, including food chains, food webs, and energy pyramids</p>	<p>b.10.A-C Write one-variable, two-step equations and inequalities to represent constraints or conditions within problems;</p> <p>Represent solutions for one-variable, two-step equations and inequalities on number lines; and</p> <p>Write a corresponding real-world problem given a one-variable, two-step equation or inequality.</p>

Flower Discovery- The Edible Schoolyard Project

In this sixth-grade science lesson, students explore and study flowers like scientists do, learn about and practice scientific drawing, label the structures and their function, and discuss their findings, questions, and ideas.

Opening Question: Ask students what they think “structure” and “function” mean.

Activity: Students explore the garden and closely examine multiple flowers. Choosing one favorite flower, they carefully draw the flower and their observations on their notepad. Various activities guide students in discussion about their flowers, following the sentence prompts, “I noticed, I wonder, it reminds me of...”

Connection to Creation Care: Focused on attentiveness, this activity trains students to notice the natural world and its beauty. Having positive interactions in the outdoors, especially as youth, promotes environmentally conscious attitudes. If tying this to a specifically Christian perspective, leaders could relate the deliberate purpose of each structure to a Creator that purposefully made creation.

Connection to Intellectual Virtues: Intellectual attentiveness (closely examining various flowers in the garden, writing down observations); Intellectual carefulness (aiming to draw a picture that mirrors the real flower)

Connection to Urban REAP: This activity could be extended beyond flowers to the aquaponics system where students could draw fish and consider their structure and

function. Further, this activity can incorporate informational writing (recording observations as a scientist would) or creative writing (writing a poem about the flower using analogies, writing a narrative from the perspective of the fish, etc.).

Targeted TEKS:

	Science	English Language Arts and Reading
Third Grade	b.10.A-B Explore how structures and functions of plants and animals allow them to survive in a particular environment; and Investigate and compare how animals and plants undergo a series of orderly changes in their diverse life cycles such as tomato plants, frogs, and lady beetles.	b.12.A-B Compose literary texts, including personal narratives and poetry, using genre characteristics and craft; Compose informational texts, including brief compositions that convey information about a topic, using a clear central idea and genre characteristics and craft
Fourth Grade	b.10.A,C Explore how structures and functions enable organisms to survive in their environment; Explore, illustrate, and compare life cycles in living organisms such as beetles, crickets, radishes, or lima beans.	b.12.A-B Compose literary texts such as personal narratives and poetry using genre characteristics and craft; Compose informational texts, including brief compositions that convey information about a topic, using a clear central idea and genre characteristics and craft
Fifth Grade	b.10.A Compare the structures and functions of different species that help them live and survive in a specific environment such as hooves on prairie animals or webbed feet in aquatic animals	b.12.A-B Compose literary texts such as personal narratives, fiction, and poetry using genre characteristics and craft; Compose informational texts, including brief compositions that convey information about a topic, using a clear central idea and genre characteristics and craft

The Garden Food Web- The Life Lab Science Program

Students will recreate a garden food web to learn about the interconnections between animals, plants, soil and sun in a garden habitat. To learn about the different roles producers, consumers and decomposers play in the garden habitat and to understand the complexity of the garden food web.

Opening question: What are producers, consumers, and decomposers? How do they work together?

Activity: To introduce the activity, pick various organisms and draw a web around them, mapping out the flow of energy from sun to plants, animals, decomposers, etc. When students are comfortable with the concept, they can explore the garden and find different organisms that fit into categories such as “decomposer,” “consumer,” “producers,” and so on. Regroup to share findings. Assign students to be in a group of decomposers, consumers, and producers and play the “Energy Game.” By tossing balls (representing energy) from the sun, to producers, and so on, students can visually see the flow of energy in the system. Reassign students to various groups to see the effect of having too few producers, decomposers, etc.

Connection to Creation Care: Students will learn about interdependence among creation. By simulating loss of organisms (i.e. taking “producers” out of the group, seeing

what the effect is on the rest of the system), this activity can also demonstrate the importance of every organism in the system.

Connection to Intellectual Virtues: Intellectual attentiveness (exploring the garden to discover where each organism fits in the energy cycle); Intellectual curiosity (offering time for students to ask questions about the cycle and consider ramifications of losing groups of organisms)

Connection to Urban REAP: Students can learn about the flow of energy in the aquaponics system. A follow-up activity could focus on learning the proportions of fish, water nutrients, and other variables needed for a viable aquaponics system. Students could calculate and graph these measurements for Urban REAP to gain a practical application of these concepts.

Targeted TEKS: This lesson plan can be modified to fit specific science and math TEKS for third through fifth grades.

	Science	Math
Third Grade	b.9.B Identify and describe the flow of energy in a food chain and predict how changes in a food chain affect the ecosystem such as removal of frogs from a pond or bees from a field	b.3.A Number and operations. The student applies mathematical process standards to represent and explain fractional units. b.8.A-B Summarize a data set with multiple categories using a frequency table, dot plot, pictograph, or bar graph with scaled intervals; and Solve one- and two-step problems using categorical data represented with a frequency table, dot plot, pictograph, or bar graph with scaled intervals
Fourth Grade	b.9.A-B Investigate that most producers need sunlight, water, and carbon dioxide to make their own food, while consumers are dependent on other organisms for food; Describe the flow of energy through food webs, beginning with the Sun, and predict how changes in the ecosystem affect the food web	b.1.A Apply mathematics to problems arising in everyday life, society, and the workplace b.9.A Represent data on a frequency table, dot plot, or stem-and-leaf plot marked with whole numbers and fractions
Fifth Grade	b.9.B-C Describe the flow of energy within a food web, including the roles of the Sun, producers, consumers, and decomposers; Predict the effects of changes in ecosystems caused by living organisms, including humans, such as the overpopulation of grazers or the building of highways	b1.A-B Apply mathematics to problems arising in everyday life, society, and the workplace; Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution b.9.A Represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots

BIBLIOGRAPHY

- “500 Cities Project: Local Data for Better Health.” *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 5 Dec. 2019, www.cdc.gov/500Cities/.
- “Air Pollution: Know Your Enemy.” *UN Environment*, 10 Sept. 2018, www.unenvironment.org/news-and-stories/story/air-pollution-know-your-enemy.
- Allison, Cheryl. “PECO’s \$40k check to Riverbend supports aquaponics program.” *Mainline Media News*, 2015
- Austin, Regina, and Michael Schill. "Black, Brown, Poor & (and) Poisoned: Minority Grassroots Environmentalism and the Quest for Eco-Justice." *Kansas Journal of Law & Public Policy*, 1, 1991, p. 69-82. *HeinOnline*, <https://heinonline-org.ezproxy.baylor.edu/HOL/P?h=hein.journals/kjpp1&i=71>.
- Barcus, Michael. Personal interview, December 17, 2019.
- Baum, F. and Fisher, M. Why behavioural health promotion endures despite its failure to reduce health inequities. *Sociol Health Illn*, vol. 36, 2014, pp. 213-225
doi:10.1111/1467-9566.12112
- Berkhof, Louis. *Introduction to Systematic Theology* . [Rev. ed.], Baker Book House, 1979.
- Berry, Wendell. “The Body and the Earth.” *Psychoanalytic Review*, vol. 81, no. 1, Jan. 1994, pp. 125–69, <http://search.proquest.com/docview/76683294/>.
- Berry, Wendell. *Jayber Crow: A Novel*. Counterpoint, 2000.
- Berry, Wendell. *Sex, Economy, Freedom, & Community: Eight Essays*. United States, Counterpoint.
- Blair, Dorothy. “The Child in the Garden: An Evaluative Review of the Benefits of School Gardening.” *The Journal of Environmental Education*, vol. 40, no. 2, 2009, pp. 15–38., doi:10.3200/joe.40.2.15-38.
- Boddice, Rob. *Anthropocentrism : Humans, Animals, Environments*, edited by Rob Boddice, BRILL, 2011. ProQuest Ebook Central, <https://ebookcentral.proquest.com/lib/bayloru/detail.action?docID=737675>.
- Bouma-Prediger, Steven. *For the Beauty of the Earth: a Christian Vision for Creation Care*. 2nd ed., Baker Academic, 2010.

- Burke, Anabel. "Magnolia Market at the Silos." *Waco History*, wacohistory.org/items/show/188.
- Burke, Anabel. "Mission Waco Mission World," *Waco History*, accessed April 16, 2020, <https://wacohistory.org/items/show/201>.
- Cairns, Kate "Beyond Magic Carrots: Garden Pedagogies and the Rhetoric of Effects." *Harvard Educational Review*, vol. 88, no. 4, 2008 pp. 516-537. <https://doi-org.ezproxy.baylor.edu/10.17763/1943-5045-88.4.516>
- Castro, Dina C., et al. "Growing Healthy Kids." *American Journal of Preventive Medicine*, vol. 44, no. 3, 2013, doi:10.1016/j.amepre.2012.11.024.
- Collins, Mary B, et al. "Linking 'Toxic Outliers' to Environmental Justice Communities." *Environmental Research Letters*, vol. 11, no. 1, 2016., doi:10.1088/1748-9326/11/1/015004.
- "Curriculum Database." *The Collective School Garden Network*, www.csgn.org/curriculum?title=&field_grade_levels_tid=912&field_theme_tid=905&field_includes_video__value=All.
- "Curriculum Overview." *The Edible Schoolyard Project*, 2017, edibleschoolyard.org/curriculum.
- "Curriculum." *Junior Master Gardener*, jmgkids.us/curriculum/.
- Diamond, Stuart. "THE BHOPAL DISASTER: HOW IT HAPPENED." *The New York Times*, *The New York Times*, 28 Jan. 1985, www.nytimes.com/1985/01/28/world/the-bhopal-disaster-how-it-happened.html.
- Dickens, Charles. *Hard Times*. Kate Flint ed., Penguin Books 1995 (1854).
- Eastin D. "UC addresses needs of California youth." *California Agriculture*, vol. 67, no. 1, 2013, pp. 3-4. <https://doi.org/10.3733/ca.v067n01p3>.
- Embry, A. Elise. "Migel House," *Waco History*, accessed April 16, 2020, <https://wacohistory.org/items/show/80>.
- Engel, Susan L. *The End of the Rainbow: How Educating for Happiness (Not Money) Would Transform Our Schools*. The New Press, 2016.
- Gardens for Learning. Creating and Sustaining Your School Garden." *California School Garden Network*
- "Gardens for Learning." *California School Garden Network*, 2010, http://www.csgn.org/sites/csgn.org/files/CSGN_book_0.pdf

- Gaylie, Veronica. "Teaching Teachers in a Learning Garden: Two Metaphors." *Clearing Magazine*, 15 Mar. 2010, clearingmagazine.org/archives/1054.
- Genello, Laura et al. "Fish in the Classroom: A Survey of the Use of Aquaponics in Education." July 2015, 10.12973/ejhbe.2015.213p.
- GESAMP, "Sources, fate and effects of microplastics in the marine environment: a global assessment" (Kershaw, P. J., ed.). (IMO/FAO/UNESCO-IOC/UNIDO/WMO/IAEA/UN/UNEP/UNDP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection). Rep. Stud. GESAMP 2015 ,no. 90
- Gnanakan, Ken. *God's World: Biblical Insights for a Theology of the Environment*. SPCK, 1999.ap
- Greenfield, Kent and Nilsson, John E., *Gradgrind's Education: Using Dickens and Aristotle to Understand (and Replace?) the Business Judgment Rule*. Brooklyn Law Review, vol. 63, p. 800, 1998. Available at SSRN: <https://ssrn.com/abstract=281618>
- Hart, Emily R, et al. "Implementation of Aquaponics in Education: An Assessment of Challenges and Solutions." *Science Education International*, vol. 24, no. 4, 2013, p. 460.
- Hayden-Smith, Rose. "'Soldiers of the Soil': The Work of the United States School Garden Army during World War I." *Applied Environmental Education & Communication*, vol. 6, no. 1, 2007, pp. 19-29., doi: 10.1080/15330150701319453.
- Health, Environment and Climate Change Coalition (HECC)." *World Health Organization*, World Health Organization, 25 May 2018, www.who.int/globalchange/coalition/en/.
- Hessel, D. T. 1992. "Introduction" in D. Hessel (ed) *After Nature's Revolt: Eco-Justice and Theology*. Minneapolis: Fortress Press, pp. 1-18.
- Hiatt, Daniel. Personal interview, April 20, 2020.
- Johnson, John G. "CAPITALS." *Texas State Historical Association*, 2010, tshaonline.org/handbook/online/articles/mzc01.
- Klemmer, C.d., et al. "Growing Minds: The Effect of a School Gardening Program on the Science Achievement of Elementary Students." *HortTechnology*, vol. 15, no. 3, 2005, pp. 448–452., doi:10.21273/horttech.15.3.0448.

- “Learn the Facts.” *Let’s Move*, National Archives and Records Administration, letsmove.obamawhitehouse.archives.gov/learn-facts/epidemic-childhood-obesity.
- “Life Lab” Annual Reports.” *Life Lab*, www.lifelab.org/about/annual-reports/.
- “Life Lab” Annual Reports.” *Life Lab*, www.lifelab.org/about/annual-reports/.
- Lineberger, S.E., and J.M. Zajicek. School gardens: Can a hands-on teaching tool affect students’ attitudes and behaviors regarding fruits and vegetables? *HortTechnology*, vol. 10, no. 3, 1999, pp. 593-597.
- Long, Edward LeRoy. *Journal of the American Academy of Religion*, vol. 39, no. 3, 1971, pp. 370–374. JSTOR, www.jstor.org/stable/1461078. Accessed 16 Mar. 2020.
- Louv, Richard. *Last Child in the Woods: Saving Our Children From Nature-Deficit Disorder*. United States, Algonquin Books, 2008.
- Mccarty, Jeanne. “REAL School Gardens Program: Learning Gardens and Teacher Training to Improve Student Engagement and Academic Performance in Low-Performing Elementary Schools.” *Journal of Applied Research on Children*, vol. 4, no. 2, Children At Risk, 2013, p. 8.
- “Media Release: Nature's Dangerous Decline 'Unprecedented'; Species Extinction Rates 'Accelerating'.” *IPBES*, ipbes.net/news/Media-Release-Global-Assessment.
- Mitchell, Debra, and Michael Mueller. “A Philosophical Analysis of David Orr’s Theory of Ecological Literacy: Biophilia, Ecojustice and Moral Education in School Learning Communities.” *Cultural Studies of Science Education*, vol. 6, no. 1, Springer Nature B.V., Mar. 2011, pp. 193–221, doi:10.1007/s11422-010-9274-6.
- Mueller, Michael. “Ecojustice in Science Education: Leaving the Classroom.” *Cultural Studies of Science Education*, vol. 6, no. 2, Springer Netherlands, June 2011, pp. 351–60, doi:10.1007/s11422-011-9333-7.
- Murdock, John. “Pope's Creation Teachings Nothing New for Francis Schaeffer Fans.” *ChristianityToday*, Christianity Today, 6 Aug. 2015, www.christianitytoday.com/ct/2015/august-web-only/pope-creation-teaching-nothing-new-schaeffer-fans.html.
- “National Agricultural Literacy Curriculum Matrix.” *National Agriculture in the Classroom*, www.agclassroom.org/teacher/matrix/index.cfm.
- O’Brien, Kevin J. “The “War” Against Climate Change and Christian Eco-Justice: Ethical Implications of Martial Rhetoric”. *Worldviews: Global Religions, Culture, and Ecology* 16.2: 135-153. <https://doi-org.ezproxy.baylor.edu/10.1163/156853512X640842> Web.

- Orr, D. W. (1990). Environmental education and ecological literacy. *Education Digest*, 55(9), 49–53
- Orr, David. “Place and Pedagogy.” *The NAMTA Journal*, vol. 38, no. 1, 2013, pp. 183-188
- Ozer, Emily J. “The Effects of School Gardens on Students and Schools: Conceptualization and Considerations for Maximizing Healthy Development.” *Health Education & Behavior*, vol. 34, no. 6, 2006, pp. 846–863., doi:10.1177/1090198106289002.
- Pothukuchi, K. 2004. Hortaliza: A Youth “Nutrition Garden” in Southwest Detroit. *Children, Youth and Environments* 14(2):124-155.
- “Poverty in Waco, Texas.” *Welfare Info*, www.welfareinfo.org/poverty-rate/texas/waco
- Ralston, Shane. “It Takes a Garden Project: Dewey and Pudup on the Politics of School Gardening.” *Ethics & the Environment*, vol. 16, no. 2, 2011, pp. 1–24, <https://muse.jhu.edu/article/456002>.
- Ray, Rashawn, et al. “School Gardens In The City.” *Du Bois Review: Social Science Research on Race*, vol. 13, no. 2, 2016, pp. 379–395., doi:10.1017/s1742058x16000229.
- Regan, Tom. “Christianity and Animal Rights” in Birch, Eakin, and McDaniel. *Liberating Life*, p. 80.
- Ritzer, George. *The McDonaldization of Society*. SAGE, 2014.
- Robinson, Carolyn W., and Jayne M. Zajicek. “Growing Minds: The Effects of a One-Year School Garden Program on Six Constructs of Life Skills of Elementary School Children.” *HortTechnology*, vol. 15, no. 3, 2005, pp. 453–457., doi:10.21273/horttech.15.3.0453.
- Rodgers, Andrew Denny. “Liberty Hyde Bailey.” *Princeton: Princeton University Press*. 1949.
- Roe, Dilys. “Biodiversity Loss—more Than an Environmental Emergency.” *The Lancet Planetary Health*, vol. 3, no. 7, Elsevier Ltd, July 2019, pp. e287–e289, doi:10.1016/S2542-5196(19)30113-5.
- Saegert, Rhiannon. “Nonprofit Jubilee Food Market Celebrates Third Year in North Waco.” *Waco Tribune-Herald*, 22 Nov. 2019, www.wacotrib.com/news/local/nonprofit-jubilee-food-market-celebrates-third-year-in-north-waco/article_8beec4ab-9e73-53d8-a03b-9d63f5070b2f.html.

- Sawyer, Amanda “Waco Tornado,” *Waco History*, accessed April 16, 2020, <https://wacohistory.org/items/show/53>.
- Schneller, Andrew Jon, et al. “A Case Study of Indoor Garden-Based Learning With Hydroponics and Aquaponics: Evaluating Pro-Environmental Knowledge, Perception, and Behavior Change.” *Taylor & Francis*, 11 Dec. 2015, www.tandfonline.com/doi/full/10.1080/1533015X.2015.1109487?scroll=top&needAccess=true.
- “School Aquaponics.” *The Aquaponic Source*, 29 Sept. 2014, www.theaquaponicsource.com/school-aquaponics/.
- “School Garden Curriculum.” *AgriCorps*, agricorps.org/school-garden-curriculum/.
- “School Gardens : Grown from the Past: A Short History of Community Gardening in the United States.” *Smithsonian Institute*, communityofgardens.si.edu/exhibits/show/historycommunitygardens/schoolgardens.
- Smith, Leanna L., and Carl E. Motsenbocker. “Impact of Hands-on Science through School Gardening in Louisiana Public Elementary Schools.” *HortTechnology*, vol. 15, no. 3, 2005, pp. 439–443., doi:10.21273/horttech.15.3.0439.
- “Students Affected by Achievement Gaps.” *NEA*, www.nea.org/home/20380.htm.
- Terry, Kurt. “Jesse Washington Lynching,” *Waco History*, accessed April 16, 2020, <https://wacohistory.org/items/show/55>.
- “The Historical Roots of Our Ecological Crisis.” 2006, pp. 61–64.
- Thorp, Laurie, and Christine Townsend. *The Pull of the Earth: An Ethnographic Study of an Elementary School Garden*. ProQuest Dissertations Publishing, 1 Jan. 2001, <http://search.proquest.com/docview/304769453/>.
- “Top 10 Countries with the Worst Air Pollution Index.” *Air Quality Index*, aqicn.org/rankings/.
- Trelstad, Brian. “Little Machines in Their Gardens: A History of School Gardens in America, 1891 to 1920.” *Landscape Journal*, vol. 16, no. 2, The University of Wisconsin Press, Oct. 1997, pp. 161–73, doi:10.3368/lj.16.2.161.
- “Urban Reap.” *Mission Waco, Mission World*, missionwaco.org/urbanreap/.
- “Waco Independent School District.” *Waco Independent School District*, www.wacoisd.org/site/Default.aspx?PageType=1&SiteID=4&ChannelID=2532&DirectoryType=6.

“Water Scarcity.” *WWF*, World Wildlife Fund, www.worldwildlife.org/threats/water-scarcity.

“Who We Are.” Out Teach, www.out-teach.org/who-we-are/.

Williams, Dilafruz R., and P. Scott Dixon. “Impact of Garden-Based Learning on Academic Outcomes in Schools: Synthesis of Research Between 1990 and 2010.” *Review of Educational Research*, vol. 83, no. 2, SAGE Publications, June 2013, pp. 211–35, doi:10.3102/0034654313475824.

Williams, Dilafruz, et al. “Science in the Learning Gardens (SciLG): a Study of Students’ Motivation, Achievement, and Science Identity in Low-Income Middle Schools.” *International Journal of STEM Education*, vol. 5, no. 1, Springer International Publishing, Dec. 2018, pp. 1–14, doi:10.1186/s40594-018-0104-9.

“Wolsey, Thomas Devere, and Diane Lapp. “School Gardens: Situating Students Within a Global Context.” *Journal of Education*, vol. 194, no. 3, SAGE Publications, Oct. 2014, pp. 53–60, doi:10.1177/002205741419400306.

Yeaman, Ashley, “The Branch Davidian Siege,” *Waco History*, accessed April 16, 2020, <https://wacohistory.org/items/show/177>.