

Edible Schoolyard NYC Impact and Evaluation Plan for 2021-2022

Our Primary Outcomes. (How we track them. Note: We use quotes and anecdotes to collect qualitative data on all of the following.)

This list combines our priority outcomes from 2018-2020 and our Covid pivot list for 2020-2021.

Students:

- Actively engage in and enjoy ESYNYC programming (Outputs Tracking)
- Are more willing to try and increase preference for plant-based foods (Outputs Tracking)
- Experience social-emotional growth (Outputs Tracking, SEL Observation Checklist)
- Develop commitment to food and environmental justice (Youth Led Participatory Action Research Project Pilot)
- Draw connections to other classroom experiences/core curriculum (School Staff Survey)

Schools:

- Prioritize the health of the school community by making food education integral to school curricula, programming, policies, and resources. (Outputs tracking, Healthy Schools Progress Report)

Families:

- Engage in ESY programs (Outputs Tracking)
- Have increased access to plant-based foods (Outputs Tracking, Parent Survey)

Professional Development Participants:

- Understand how to implement Food Education in their school/organization, and feel inspired and prepared to do so (Professional Development Participant Surveys)
- Implement Food Education at their school/organization (Professional Development Participant Surveys)

For the Full Outcomes framework with all our outcomes, tracked and not tracked [click here](#).

Program Evaluation Plan for 2021-22 School Year

Professional Development Participant Survey

- All participants
- Immediately post-workshop and 6-12 months follow up
- Digital via phone/tablet in person and email remotely
- Measures impact of workshop on inspiration and preparation to lead garden and cooking programming; change in program frequency, reach, impact

Program Outputs Tracking

- All schools
- Continuous
- Digital record by program staff on Google Sheets
- Tracks
 - how many students tried the tastings offered in our lessons
 - how many, what kind of participants in workshops, events, farm stands, volunteer program, lessons

Quotes and Anecdotes are collected weekly by program staff

- All schools
- Continuous
- Digital record by program staff on Google Sheets
- Illustrate student, family, and school outcomes

School Staff Survey

- Targeted to specific groups of staff, as needed
- February-March 2022
- Digital survey sent via email on Alchemer web software
- Assess attitudes toward, capacity for, and implementation of food education
- Can add student outcomes if desired

Guardian Survey

- Targeted to small groups to get feedback on specific program initiatives, as needed
- February-March 2022
- Digital survey sent via email, google Classroom, or Class Dojo on Alchemer web software
- Solicit program feedback and assess needs as necessary
- Can add student outcomes if desired

If capacity allows: Possible Pilot of Youth-Led Participatory Action Research Pilot

- Upper Elementary students, possibly from leadership groups
- Design and implement qualitative research project as a part of in-school or extracurricular work
- Spring-Summer
- Students share about developing commitment to environmental and food justice

(Pending being in-person) Healthy Schools Progress Report (a FoodCorps tool developed by Columbia Teachers College)

- All schools
- Fall for new schools and summer for all schools
- Paper record reported by Program Managers
- FoodCorps schools submit to FoodCorps, Non-FoodCorps Schools submit to ESYNYC

- Measures changes in the health of the school environment
 - Culture of health
 - School meals
 - Garden and cooking lessons

(Pending being in-person) SEL Observational Checklist Pilot

- All Schools
- Spring, 2-3 observations/ teaching team
- Program Managers and Director of Programs and Education conduct observations on paper or tablet to submit to Senior Evaluation Manager
- Measures implementation of SEL practices by educators; and self-understanding, self-management, social awareness, responsible decision-making, and relationship skill indicators for students

FoodCorps Schools also collects their own

- Optional: Student vegetable preference survey pre/post for 2 classes per school (paper)
- Periodic outputs tracking (digital)
- Optional: Healthy Schools Progress Report (Fall for new schools and spring for all schools) (paper)

Edible Schoolyard NYC Logic Model of our Primary Outcomes- How Our Model Works

Our Theory of Change: ESYNYC offers and promotes culturally relevant, hands-on gardening and cooking programs during and outside of the school day. Students, families, school staff, and other community members benefit from the personal learning and dietary behaviors shifts and socio-emotional growth, as well as school culture and physical environment improvements that come from our support. Ultimately, our work nurtures healthy school communities where all members can thrive socially, emotionally, academically, and physically.

ESYNYC Services/Activities	Target Constituents	Short-term Outcomes	Intermediate Outcomes	Impact
Direct Service <ul style="list-style-type: none"> Utilize an Food Education curriculum and programming Involves different levels and lengths of program engagement depending on the site Includes remote/virtual, in-school, extra-curricular, and community ESYNYC-led Food Education lessons and events, as well as the distribution of resources and outfitting of spaces 	Schools Historically under-resourced NYC public schools (district & charter)		<ul style="list-style-type: none"> Prioritize the health of the school community by making food education integral to school curricula, programming, policies, and resources. 	
	Students 3K/PK-8 th graders who participate in program	<ul style="list-style-type: none"> Actively engage in and enjoy ESYNYC programming Are more willing to try and increase preference for plant-based foods Draw connections to other classroom experiences/core curriculum Experience social-emotional growth 	<ul style="list-style-type: none"> Develop commitment to food and environmental justice* 	<ul style="list-style-type: none"> Healthy school communities in NYC and beyond, where students and other members can thrive socially, emotionally, physically, and academically Community members supporting personal, community and/or environmental health A just and sustainable food system for all
	Families of participating students	<ul style="list-style-type: none"> Have increased access to plant-based foods Engage in ESYNYC programs 		
School & Nonprofit Educators who participate in ESYNYC Professional Development sessions	<ul style="list-style-type: none"> Understand how to implement Food Education in their school/ organization, and feel inspired and prepared to do so 	<ul style="list-style-type: none"> Implement Food Education at their school/ organization 		
Professional Development <ul style="list-style-type: none"> Participate in ESYNYC workshops, consultations, and/or through observing ESYNYC programming in action Utilize an Food Education curriculum and program 				

Indicators of Success for each Outcome and Measurement Tools

Priority Outcome	Indicator(s)	Tool
Prioritize the health of the school community by making food education integral to school curricula, programming, policies, and resources.	Increase in score (overall, by sub-category, by specific areas within sub-categories) on Healthy School Progress Report, annually and since inception of ESYNYC partnership, maintain “flourishing” rating.	Healthy Schools Progress Report
Actively engage in and enjoy ESYNYC programming	Staff collect quotes and anecdotes informally from students, school staff, and family on observing these feelings and tracking which kind of programs have the best attendance. Staff track attendance in remote and in-person programming, aiming to reach each enrolled student.	Outputs Tracking
Students are more willing to try and increase preference for plant-based foods	Maintain 95% or higher average of students who try tasting in ESYNYC lessons	Outputs Tracking
Students experience social-emotional growth	Managers observe students practicing SEL skills and demonstrating SEL core competencies in ESYNYC lessons School staff report observing positive SEL changes	SEL Observational Checklist Pilot School Staff Survey
Draw connections to other classroom experiences/core curriculum	School staff report observing students making these connections and their level of participation in activities and lessons outside of ESYNYC	School Staff Survey
Students develop commitment to food and environmental justice	Students involved in leadership programs will create project to measure and report on their efforts to contribute to food and environmental justice	Youth led participatory action research project pilot
Families engage in ESYNYC programs	Staff record family programming offered and level of participation and measure against goals	Outputs Tracking
Have increased access to plant-based foods	Staff record food distributions and measure against goals	Outputs Tracking
Professional Development Participants understand how to implement Food Education in their school/organization, and feel inspired and prepared to do so	Participants report level of inspiration Participants report having learned new activities, skills, etc that they will use in their own programs. Aim for maintaining 90% or higher.	PD Post survey
Professional Development Participants implement Food Education at their school/ organization	Participants will report increased reach, number or type of food education offerings at their own sites. Participants will report having used something they learned in the workshop at by 6 months later.	PD follow up survey

Transforming Children’s Relationship to Food: A review on the impact of Edible Education programs like Edible Schoolyard NYC

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Edible Schoolyard NYC offers and promotes culturally relevant, hands-on gardening and cooking programs during and outside of the school day. Students, families, school staff, and other community members gain knowledge, improve their dietary behaviors, and develop socio-emotionally in our programs. They also enjoy the benefits of school culture and physical environment improvements that come from our support. Ultimately, our work nurtures healthy school communities where all members can thrive socially, emotionally, academically, and physically.

This review uses evidence from the scientific literature to support the theory of change that ESYNYC enables. In this paper, we describe the outcomes of garden and cooking education and how they help us to achieve our mission. First, we review the more frequent research impacts on dietary and academic benefits. Then, we explore new areas of research in detail, including socio-emotional learning, commitment to food justice, and environmental awareness.

Trends in Childhood Dietary Diseases

Poor nutrition and lack of physical activity have contributed to the rising burden of noncommunicable diseases in the United States. These include cardiovascular disease, high blood pressure, type 2 diabetes, obesity, and cancer. ¹ According to the CDC, about half of all American adults or 11 million individuals have one or more preventable chronic diseases. More than two-thirds of adults are obese or overweight. Among children and youth, nearly one-third are obese or overweight.² These high rates increases health risks among growing children. Thus, healthy eating in childhood is important both for proper development and prevention of various health conditions.

Diet-related diseases affect all ages, but some racial and ethnic minorities are at disproportionately greater risk.³ Hispanics and non-Hispanic blacks have higher prevalence of obesity.⁴ Also, individuals with low socioeconomic status (SES) seem to be at a greater risk of dietary diseases.⁵ Childhood obesity disproportionately affects low-income communities and communities of color. The National Health and Nutrition Examination Survey (NHANES) indicate that obesity rates are higher among Mexican-American children than the general population of U.S children.⁶

There are many forces that influence the development of childhood chronic diseases and health disparities among racial/ethnic minorities. Health disparities adversely affect groups of people due to social, economic and/or environmental disadvantage. Multiple factors that influence children’s eating behaviors and dietary habits include SES, food preferences, family environment, and the physical environment. For example, availability of and access to nutritious food play a crucial role in this health disparity. Accessing affordable, high-quality and healthy food is a challenge for many families in low-income neighborhoods of color. Racial minorities and low SES families are more likely to live in these neighborhoods that have limited access to affordable fresh food. Also, research has found inadequate consumption of fruit and vegetables

among adolescents from low socioeconomic backgrounds.⁷ Differences in environmental support underlie health disparities between racial and socioeconomic status (SES) groups.

In the state of New York, childhood obesity has tripled over the past three decades. Currently, a third of New York's children are obese and overweight.⁸ In New York City, too many of the 1.1 million public school students aren't getting the food they need to thrive.

- Nearly one in four children in NYC is food insecure.⁹
- Over 40% of NYC public school children are obese or overweight.
- Obesity rates in East Harlem are three times what they are on the Upper East Side, just a few short blocks away.

Research has shown that consuming a diet high in fruit and vegetable reduces the risk of chronic diseases such as hypertension, heart disease, and stroke and may lower the risk of type 2 diabetes.¹⁰ Increased fruit and vegetable consumption can also help prevent the development of obesity.¹¹ According to the CDC, sixty percent of children do not eat enough fruit to meet daily nutritional recommendations, while 93% of children don't eat enough vegetables.¹²

As eating habits are set early in childhood, many prevention strategies that target children's eating behavior at an early age can be impactful. Also, since children spend the majority of their day in school, schools play an essential role in exposing and providing many opportunities for children to learn to eat healthfully. Schools can create a food environment that supports students in making healthy choices. Thus, Edible Schoolyard partners with New York City public schools to cultivate healthy students and communities to transform children's relationship with food. Also, ESYNYC works mainly in schools located in low-income communities, areas identified by the NYC Department of Health as having the highest rates of diet-related diseases.

Dietary Impacts

Edible Schoolyard NYC has made a major commitment to evaluating the program's impact. We use data from surveys, interviews, observations, and more to improve our programming, report back on our achievements, and share best practices with others. Our primary outcomes include student's willingness to try, preference, and consumption of plant-based food. When our students grow and cook their own plant-based foods, they are more willing to try them, like them more, and feel more confident about cooking. 98% of students try the food they made in the lesson. 78% of students who took the survey as 3rd graders and then again as 5th graders significantly increased their vegetable preference. A 4th grader at Brooklyn Gardens Elementary School commented "I love cucumbers, but I didn't know I liked cucumbers until I remembered to try new things."

The existing literature cites numerous dietary impacts of school gardening and cooking programs among participating students. Common outcomes reported include changes in knowledge in preparing, cooking, and eating healthier food, attitudes and preference for plant-based food, and eating behaviors and habits. Participation in school gardening and cooking programs have been found to increase children's exposure¹³ and ability to identify fruits and vegetables^{14 15}. In addition, changes in children's attitudes have been measured such as attitudes toward fruits and vegetables, preference for fruits and vegetables^{14,16,17} and willingness to try them^{17,18}.

For example, nearly all children (97.8%) who participated in a garden pilot project designed to promote fruit and vegetable intake among 4th to 6th graders enjoyed taste-testing different fruits and vegetables. When asked about future participation, some responded, “Yes, because it was fun trying foods I have never tried” and “I would because it’s fun learning about new foods.”¹³ As willingness and liking are important determinants of consumption among children, these changes in attitudes have been found to impact behaviors of consuming fruits and vegetables¹⁶ and asking for fruits and vegetables at home¹³. Participation on the garden pilot project positively impacted the child’s family and home food environment. These results are similar to other studies that show the connection between gardening and positive changes in dietary behaviors at school and home.

Academic Impacts

Our students connect their work in the kitchen and garden to their core academics. PS 216 teachers found that second grade students demonstrated strong competence about plant life cycles and needs. They noted that learning reflection works best immediately after doing garden tasks. One teacher commented, "This is exactly what they need because we've talked about it in class but they haven't gotten to really practice it. And we have been learning subtraction and I have been asking the kids how many signs do you have left to find and they're practicing the new subtraction strategy they learned yesterday.”

The positive benefits of school garden and cooking program extends beyond health effects and have been shown to impact academic achievement. School gardens and kitchens are proving to be thriving centers of learning that equips students with knowledge and skills to succeed academically¹⁹. Several programs have found increase in science^{20, 21}, nutrition^{19,21}, and environmental²¹ knowledge after participation in gardening and cooking lessons. Increased science knowledge and improved environmental attitudes are common outcomes among children who participate in gardening lessons.²¹ Participants in garden lessons improved in science achievement test scores.²⁰ Students pre- and post-test result after completing a gardening program revealed significant gains in knowledge about science, horticulture, and the environment.²¹

In addition, changes in academic attitudes have been observed such as increased interest and enjoyment^{21,22}, academic engagement²³, and positive attitude toward school²³. In a study of a seed to table program,, participating children expressed enthusiasm and growing confidence at school. Many frequently described how they looked forward to kitchen and garden days and how the addition of the program changed their school environment.²²

Participation in similar programs have also improved academic behaviors and performance as evidenced by improved test scores^{20,24} and potential to close the achievement gap²⁵. In the US, the achievement gap refers to the significant and persistent disparity in academic performance or educational attainment between different groups of students.²⁶ By creating more environmental equity in schools (as measured by the presence of school gardens,), academic achievement improved. Students who attend schools with gardens are more likely to perform at the proficient or advanced levels on standardized tests.²⁵

Hands-On & Experiential Learning

ESYNYC’s approach to food education is to provide a creative and interactive experience in the classroom where working with food is fun. The literature suggests that hands-on and

experiential learning are the best practices in program delivery. Hands-on education leads to better outcomes than traditional academic education.^{27,28} For example, hands-on activities such as following a recipe, preparing, and cooking the meal have the potential to facilitate dietary changes in food-related behaviors. Children are more willing to try and consume food they prepared and cooked themselves. Incorporating activities teaching children how to make a simple and healthy meal could lead to an improvement in dietary habits.²⁹

From our lessons, students develop confidence in their cooking skills. Student surveys show that the vast majority of our students are meeting our grade-level benchmarks for culinary efficacy skills. Some of these culinary skills include cutting with knives, measuring ingredients, reading recipes. Students who took the survey as 3rd graders and then again as 5th graders reported a 44% increase in their confidence in their knife skills.

Socio-Emotional Learning Impacts

Our students love Edible Education and are developing socio-emotionally. Anecdotal evidence from staff, students, and family members tells us that students gain confidence, practice empathy and teamwork, and see themselves as leaders thanks to our programming. We are investigating how we can capture these impacts more rigorously by looking at the current literature on how to best measure student's socio-emotional learning.

Although abundant evidence from the literature supports school gardening and cooking program's impacts on student's dietary behavior and academic learning, a paucity of information exists on social and emotional development. ESYNYC believes that socio-emotional growth is an important impact of our work.

Social emotional learning (SEL) refers to the process through which people understand and manage emotions, set and achieve positive goals, feel and show empathy for other, establish and maintain positive relationships, and make responsible decisions.³⁰ Programs that focus on SEL "attempt to enhance emotional intelligence and emotional literacy and the development of what are perceived to be fundamental social and emotional skills".³¹ Social competence can be defined as the ability to successfully and appropriately select and carry out interpersonal goals.³² The capacity to appropriately apply social skills such as communication, decision-making, and teamwork demonstrates a child's social competence. School cooking and garden programs have the potential to teach children social and life skills by incorporating them into hands-on activities that promote retention of such skills at a critical time of childhood development.

Development of social and emotional competencies are essential to student's success in school. Children who possess the skills and competencies to manage their emotions, focus their attention, problem solve difficult tasks, and navigate relationships with peers are able to learn more and engage more effectively in the classroom. Thus, the literature suggests that programming of interventions that focuses on social and emotional development makes a positive difference for children's academic achievement and behavior. In particular, a growing body of evidence shows that socio-emotional learning impacts executive functioning, self-efficacy, persistence, prosocial behavior, grades, and test scores.³³

Within the literature, several constructs have been identified that demonstrate the impact of hands-on gardening and cooking programs on children's socioemotional learning development. The next sections address these in detail.

Communication skills

Gardening and cooking programs have been found to influence children's ability to communicate inside and outside the classroom. Working with peers, group activities encourage communication and collaboration with peers. For example, the youth that participated in a year-long garden program increased their communication skills, such as listening to others, following directions, and getting others to understand when they say something.³⁵ Outside school, children who participated in kitchen programs actively converse with their families about healthy eating.³⁶

Teamwork, decision-making, and interpersonal relationship skills

Gardening and cooking activities often involve group learning and promote the development of team-building and leadership skills. Hands-on activities allow children to collaborate and build cooperative relationships with each other, as well as improve decision-making personally and collectively.³⁵ Those that participated in the year-long garden program mentioned above reported improved skills in working with other people, working well in a group, and thinking what other people want to say is important. Students who participated in a classroom cooking lessons described positive experiences and are more likely to consider their classmates as friends.³⁷

Pride and ownership

In addition, through experiential learning, students can gain a sense of personal achievement. Hands-on activities foster pride and enjoyment among program participants.³⁸ Providing kids autonomy to carry out the activities empowers them with a sense of pride and ownership of the space and the program.^{22, 38} Some children expressed a sense of achievement from their "hard work" in the garden. The activities in the garden created a sense of ownership and connection to the school. One child proudly claimed that "it was my idea to put flowers around the shed."²²

Self-efficacy and self-understanding

Students who successfully execute and complete tasks and responsibilities develop stronger self-efficacy and self-understanding.³⁹ Children who possess self-understanding can make their own decisions, try to do their best, and are proud of oneself. Then, children are able to believe in their ability to succeed in specific situations or accomplishing a task.

Gardening and cooking present tasks and responsibilities that help equip students with skills. Success in those tasks promote retention of skills and increase student's self-confidence.³⁹ Intentions through goal-setting is a strong factor in an individual's behavior such as dietary practices.⁴⁰ With an enhanced sense of personal achievement, students feel more confident in being able to tackle and complete future tasks. Also, students report an increased sense of agency or the ability to make a difference. Service-based learning has the potential to educate students about social justice, civic engagement and personally mobilize and drive them toward positive social change.⁴¹

Positive relationships and community cohesion

On a broader level, participation in these program cultivates positive relationships and community cohesion. Students develop positive relationships with peers, teachers, and staff. A teacher described the activities in the kitchen and garden as "excellent for cooperation: boys, girls, adults, friends are all engaged in the same task and work as a team to achieve it." This is

demonstrated in learning table manners such as setting up a table, seating together, and passing the food around. Also, learning together with the children enhances student-teacher relationships. Working in groups, children are able to expand their social networks beyond immediate friendship groups.²² The integration of gardens programs in school promoted a positive learning environment to promote academic learning as well as socio-emotional development.

In addition, gardens strengthen communities by providing a safe space for students to get to know each other and build connections together. The literature shows that involvement in community gardens have effects on creating a cultural identity and shared goals and experiences. Moreover, evidence links community garden to improved safety with reduced crime and decreased stress.⁴⁶

Further benefits were found in overcoming neophobia³¹, encouraging volunteerism³⁴, and promoting leadership³⁴. Also, an emerging theme in the literature explores the potential of these programs on addressing issues of concern to the community and advancing agendas on food and environmental justice.

Food and environmental justice impacts

New areas in the research present impacts of hands-on gardening and cooking programs on the development of attitudes toward food justice and environmental awareness. These programs strengthen student civic engagement, promote leadership and volunteerism, and mobilize them as activists committed to social justice and environmental stewardship.

The emerging food justice movement adapts many of the principles that environmental justice uphold. Environmental advocates seek to improve and maintain a clean and healthy environment. In addition, environmental justice principles ensure “all people and communities are entitled to equal protection of environmental and public health laws and regulation”,⁴² and that no group of people bears a disproportionate burden of environmental problems. Food justice advocates extend the domain of the environment as the place “where we live, work, and play” and applies it to “where, what, and how we eat”.⁴³ Similarly, food justice seeks to reduce disparities, transform the food system, and bring about change through community-based advocacy.

As seen in many environmental education programs, action-oriented stewardship practices develop youth and community assets.^{44,40} Furthermore, environmental action leads to positive youth development and cultivates assets such as critical consciousness, authentic care, and collective competence.^{39, 44, 45} In these areas, more research needs to be conducted to assess how development programming can contribute to these positive outcomes.

Recommendations

There is a substantial and rigorous body of evidence supporting the positive health and academic outcomes of hands-on gardening and cooking programs. Experiential learning have been found to increase the desired impacts. In addition, such programs promote the development of critical life skills among children and youth. Although numerous studies explore programming in socio-emotional development, few assess the impact of gardening and cooking programs on these learning outcomes. Even more, impact on nurturing attitudes toward food justice and environmental stewardship need further exploration in the research. These areas beyond health

and academic impacts demonstrate promising benefits of hands-on gardening and cooking programs.

Endnotes

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